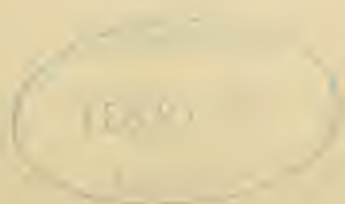


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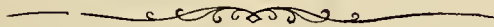
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The Railroad Record.

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CINCINNATI, - - THURSDAY, MARCH 2, 1871.

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The Electric Signal.

Since the New Hamburg calamity we have had the usual flood of suggestions from scientific as well as non scientific men of the best means to prevent the recurrence of such accidents. Many of the plans proposed are valuable, and might be adopted as improvements upon those now in use, but none, so far as we know, propose that of sound, (an appeal to the ear as well as the eye,) and electrically produced. There are parti-colored lights and flags proposed that are to be placed in certain positions, swinging horizontally, or rising and falling at regular intervals, or revolving, and for day or night use as the cases may require, but so far as all these are concerned the old objection comes up against them, viz: "color blindness," an infirmity more general than we are aware of, and that is so difficult of detection, to say nothing of other disturbances our experience in the use of such signals proves they are liable to.

These are all well enough, but we contend they are not sufficient, and should not be relied upon, particularly when another and safer and quicker method of signaling can be used as auxiliary to this sight system. Certainly an appeal to two of our senses is better than to but one, and that one subject to the deceptions we have mentioned; and certainly, the importance of railway signaling at all, warrants the use of every means by which its

object shall be secured. Expense is nothing, the trouble of it is nothing to be compared to the losses and horrors that have occurred so often of late, and that are likely to happen at all times, because the eye alone is depended upon.

We are really astonished, that in all the considerations that have been made on this important subject so very few suggestions have been made for other means of warning than mere variations or complications of the old ones, and that these few have been so indifferently received. It shows how rooted we become in any plan we have been long following, and how very difficult it is to get out of the old groove. But out we must come, sooner or later, and when we do our wonder will then be, why we run therein so long.

We remember when the proposition to use the electric fire alarm signal in our cities was hooted, and the most dreadful consequences by the fatal element predicted as sure to follow when we relied upon any other alarm than that of the yelling and shouting of half crazed boys and men. But the change was made, and now we think that if it was announced that the electric fire alarm would be suspended but for a single night there would be consternation in our midst indeed.

The same will be true when we adopt the electric railroad signal, which will be as great a reform in railway management as it was in our metropolitan fire departments. In our opinion it will be the first step in a plan of warnings that will develop into a system so perfect that such accidents as are now so frequent and so shocking upon our railroads, can only happen by negligence or willfulness of the highest criminality.

We have described the electric railway alarm so often in our columns, that our readers all know how simple and effective it is, and many of them, we know, like ourselves wonder why it has not come into use. Wait a little longer, it must win. The public are becoming aware of its importance, and when they command who dare disobey? Soon, some one, individual or company, will be bold enough to take hold of this new plan and put it into use, and not only contribute to the great cause of humanity in securing greater safety to the traveling public, but lay the basis of one of the largest and quickest fortunes in America.

—They are talking of introducing palace street cars in some of the Eastern cities. The coming vehicles is to be lighted by gas, headed by steam, and run by compressed air.

—It is stated that an important section of the Russian railway system, 286 miles long, has just been opened, placing St. Petersburg in direct communication with Revel, the well known important port on the Baltic.

—The proposed railroad along the north side of the Missouri, is being actively agitated in the counties interested.

Cincinnati & Michigan Railroad.

The incorporators of this new scheme met at Celina, in Mercer county, Ohio, on the 15th inst., and effected an organization by electing N. P. Guffey as President; J. K. Brandon Treasurer, and K. Albery, Secretary.

These are good men for their respective positions, and ought to command that public confidence that is necessary for the success of their undertaking. If they do not we are sure it will be no fault of theirs, but whether they will, remains to be seen. The dear public is a strange and most refractory creature to deal with. It cuts up all sorts of unexpected antics, among which is frequently that of kicking to death or crippling its most faithful and experienced servants.

The man or men who head a public work that depends upon the dear people for support, take upon themselves a load under which the strongest and most enduring will stagger if not actually break down. They have engaged to contend with the superstitions of the ignorant, the graspings of avarice and the tricks of the envious. Their efforts will be unappreciated, their motives misinterpreted and open to the most annoying suspicions, their individual characters as public men or private citizens will suffer from the insidious assaults of the most villainous slanders, and if they fail in their endeavors they need not expect a particle of commiseration from the public they have struggled to the death to serve any more than they will reap the reward of public approbation if they succeed.

The moment they assume such responsibilities they become public victims, and must expect such buffetings as we have suggested, finding their reward, if at all, in the poorest pecuniary considerations for the extent and character of the services rendered and the sacrifices made, and that rich satisfaction every man feels in having tried to the best of his abilities to do what must benefit others more than himself.

We do not want to discourage men from engaging in such ventures, but "forewarned is forearmed," and they may as well know that the fascinations of such a life are in the anticipation rather than the execution of great public works.

—The expense of the war to North Germany, according to the Cologne Gazette, is more than a million thalers (a thaler is about 3s.) per day. It has already cost 119,000,000, or, including the marine, 121,000,000 thalers. A new loan having become necessary, the proposal of the Government is that they should have general authority to borrow 100,000,000 thalers, it being contended that it is neither politically nor economically advantageous to depend on foreigners, and that Germans are rich enough to advance the necessary funds. Austria, Russia Italy and Turkey are cited in proof of the undesirability of raising a loan abroad.

Chicago Narrow Gauge Enterprises.

Prominent citizens of Chicago have organized a "Narrow Gauge Construction Company," and are now examining into certain proposed narrow gauge short lines to mining and manufacturing districts in this vicinity.

It would be premature to refer to any project or projects in detail. It is proposed to build,—not a 3 ft. 6 in. gauge, like that of the two lines building from Toronto to Ontario (fully described in the *Review* of Dec. 29),—but a 2 ft. 6 in. gauge. The favorable opinion of this gauge for a line demanding any gauge narrower than the standard is the result, in this instance, of a study of the narrow gauge problem both in its engineering and commercial aspects, and of thorough personal observation by a gentleman connected with the company, of the construction and operation of all the narrow gauge systems of Europe. He has also visited the Toronto roads, since our examination of them, and has gone over the whole ground, making estimates of the maximum cost per mile of construction and equipment. As these, however, are only general, and are not applicable to this particular locality we need not give them. At this preliminary stage of the project, it will suffice to very briefly give the details.

It is proposed to lay on a $4\frac{1}{2}$ ft. tie resting on 6 ft. bed, a 25 lb. rail. The drawings exhibit an engine of the best American pattern—the drivers brought well forward, with Bissell trucks. The weight will be 10 tons, capable of hauling 40 freight cars, each weighing $1\frac{1}{2}$ tons and carrying $3\frac{1}{2}$ tons. The drawings show a box car 6 ft. wide and 12 ft. long, floor 2 ft. 7 in. above rail, on 2 ft. wheel. The passenger car is 30 ft. long, with floor countersunk, and seats at side; running on three pairs of wheels, connected with Clark's radial axle—the same as that described in our article on the Toronto roads. Coal cars are proposed, 30 ft. long, each carrying 5 tons.

The engines will be constructed with view to coupling, and running two together if desirable, with arrangements necessitating but one engineer and one fireman for both—thus securing the same result, without any of the mechanical impracticabilities, sought to be attained by Mr. Fairlie in his *Little Wonderful* curiosity.—*Chicago Railway Review*.

A WHOLE NEWSPAPER ON ONE SQUARE INCH OF PAPER.—London, Nov. 15.—Last night I received from one of your correspondents in Paris the most extraordinary thing in the way of a newspaper that I have ever seen. Your correspondent had cut all the news columns of the Paris Journals of November, had pasted them together, and then photographed them, reducing what filled seven columns of print to a space scarcely more than an inch and a half square. This he forwarded by balloon mail; and although to the unassisted eye its contents were undecipherable, by the aid of a very powerful magnifying glass and a strong light it could be read.—*World*.

—The most valuable diamond found in the United States was picked up by a workman at Manchester, Virginia, on the banks of the James river opposite Richmond, in 1856. In its rough state it weighed 23.7 carats; after cutting, 12 carats but it was not very brilliant. A stone weighing four carats was found some time since in Kentucky, and was sold by the finder for a quart of whisky. It was sent to London, cut down to two carats, and sold for \$70.

ERIE MANAGEMENT.

It is much easier to find fault with things than it is to make them better, and as a rule, we believe the chronic growlers are the most incapable of creatures to remedy the wrongs they complain of.

We have no better illustration of this than the persistent and repeated attacks made upon Gould and Fisk for their management of the Erie Railway. We are not the defenders of these celebrated gentlemen, but we venture to say that the men are scarce, very scarce, and not to be found at all among the ring, now organized to displace them, who could have taken this road in the condition it was when placed under their control, and since that time and amidst such complications and embarrassments as have beset them, brought it to such a state of perfection as to render it more popular with the traveling public than either of its great rivals.

"Desperate diseases require desperate treatment," says the old proverb, and we may add, and desperate men to apply them; but if they cure, who does not justify them? Better this than to die. So think we of Erie matters. When Gould and Fisk came to the heap of its affairs, it was a most discouraging and unenviable position, but the right men were in the right place. They saw at once that some bold and unusual measures must be inaugurated, or Erie was doomed to go so far below its rival lines as to lose its natural advantages forever. They were equal to the occasion, and applied those severe remedies that have astounded the railway managers of the world, but they saved the road, gave it extensive and most valuable connections, and made it one of the safest, most reliable and best managed lines for all the interests of the people in the whole country. *

And now comes the growlers, this time in an organized form with an abundance of capital, and Mr. John Swanu at the head, who set up their lamentations by appealing first to the public for sympathy and popular condemnation of the financial immoralities of Messrs. Gould and Fisk, and second, to the Federal Courts for possession of the road now rendered so valuable by the efforts and skill of these gentlemen.

Of the "first" we unhesitatingly say, the public know they have a good and safe and magnificently equipped road in the Erie, and that all this has been brought about by the operations of Gould and Fisk, and they will not inquire into nor care about the financial immoralities of these gentlemen, and at any rate would probably prefer them to those foreign ones that these other parties may introduce among us.

And of the second point, we opine the Courts will conclude the *equity* of the case will be served by permitting the parties to manage the road who have rescued it from destruction and made it what it is.

But these are matters in the future, and in which we are in nowise concerned. It is the management of the Erie we wish to consider, and upon this subject we quote in full, an able and well written article by a gentleman of our city whose experience in railroad affairs is quite extensive, and whose opinions thereupon are entitled to the highest respect:

"Within a year or more past a great deal has been said by the press of the country concerning the management of the Erie Railway, and very much has been uttered and printed against the policy of those who are at the head of its control. If all this talk had been confined to simple criticism of a policy or a line of action, it might have been passed unnoticed, and the matter might have been turned over to the vindication of time, whose judgments are unerring. But not so. What should have been sober argument proved to be nothing but *personal* abuse; and what should have been a manly controversy of opinion, degenerated into vilification of private character. The managers of Erie were denounced as "thieves," as "swindlers," as "plunderers;" not even their domestic lives were sacred from savage journalistic assaults. Their personal habits were ridiculed. Their style of living was severely criticised. The cost of their houses and furniture was calculated with mathematical nicety. Even their door plates were described.

The New York Tribune—a journal whose documen has always been its greatest pride—has led in this merciless crusade, with its long coated and short pauldroned philosopher as a sort of modern Peter the Hermit. Day after day the columns of that paper have been filled with slurs, insinuations, unmistakable hints and downright charges. Its imitators throughout the country have caught up the cry, and joined in full pursuit. But bare assertions are not proof, and generalizations do not usually carry with them conviction. The charges of the Tribune and its followers have been wholly unsupported by reference to specific or well supported facts. It has been roundly asserted, and the allegations tenaciously persisted in, that immense frauds were being perpetrated in the management of Erie, and that the principal managers were becoming enormously wealthy at the expense of simple stockholders, whose lamblike innocence was only equaled by the wolfish rapacity of the terrible managers. But this is by no means satisfactory to those who desire to know the truth rather than to be regaled on vague speculations. What is wanted is some definite, specific charge, backed up by dates, figures and all the accessories of proof, which shall carry conviction of the truth of the particular allegation made. Let these gentlemen who indulge with so much

facility in sweeping assertions put their fingers on specific instances of fraud, and stop indulging in generalities. If they will do this, it will be something more than they have yet done. It will also be a great satisfaction to the people, who are about tired of hearing hints of fearful things, yet never seeing the evidence. It is the testimony of a gentleman lately in high authority on the Erie Railway, and under whose eyes passed all the financial accounts of that vast corporation, that during the entire term of his administration of his department the managers of Erie in no way interfered for their own gain with the exercise of his duties. The gentleman alluded to is above reproach; he retired from his office a poor man, as he entered into it, and resigned only on account of ill health. No one can impugn his testimony as interested.

The New York papers, of Saturday last, contained a quite lengthy invitation, put forth by one "Mr. John Swann, of London," addressed to Erie bondholders, and asking them to unite in a petition to the New York Legislature for an amendment to the law relative to the election of Erie Directors. The explanatory card, which serves as an introduction to Mr. John Swann's manifesto, says that "the petition has been numerously signed," but singularly enough it gives no names of any of the gentlemen associated with him in the laudable task of annihilating the wicked managers of Erie. Even Mr. John Swan's own name is not signed to the document. This looks of itself suspicious. But in the petition there are one or two statements which illustrate the loose and reckless manner in which these charges have all along been brought. Mr. John Swann says that since Messrs. Gould & Fisk took the management of the Erie road, they can not show "more than \$6,300,000 expended in permanent improvements of and additions to the road and its appurtenances." Mr. John Swann simply makes an assertion, but gives no proof. How conveniently Mr. John Swann slips in that adjective "permanent!" When Messrs. Gould & Fisk were elected to the control of the Erie its iron was worn and its roadbed in bad order. There is now no better track in America. Does Mr. John Swann say that is not a permanent improvement? It was then deficient in passenger coaches and equipments. Now there are plenty, and as fine as any road in this or his own country can show. There was no steel rail. Now the entire track is being gradually changed, the iron rails giving place to the steel. Then there were thirty or more different classes of engines on the line; now two uniform styles only are constructed—one for passenger and one for freight business. Then it was scarcely safe to run twenty miles an hour, now the road is as safe at forty-five miles as human precaution can make it. Then there was no outlet for freight from Buffalo or Dunkirk, except over the track of a line whose interests are with a competing line to Erie; now a new independent line for passenger and freight traffic has been secured by way of Suspension Bridge. This new line alone will be worth more than \$6,000,000 to the Erie. Does Mr. John Swann persist in his statement that no "permanent" improvements have been effected? What does he call the above, if not improvements? And let him remember that all this (with many other valuable and "permanent" improvements) has been accomplished by *two men in two years* with a perfect avalanche of suits, injunctions and petitions crowding on them, very similar in effect to the one "Mr. John Swann, of London, England," now proposes to bring before the New York Legislature. The secret of the opposition on the part of the Tribune is that Messrs. Gould and Fisk are opposed to it politically. The secret of Mr. John Swann's opposition, and that of his friends, is that they desire to secure the management of the Erie to themselves. Again, a great hue and cry is raised because the executive power of Erie is exercised so fully by Messrs. Gould and Fisk, and it is bitterly complained that they have elected themselves to their present position, and are keeping themselves there. "Mr. John Swann, of London, England," brings this charge with a gravity which would be really ludicrous, were it not that the poor fellow is evidently very serious, and takes the matter much to heart. And why, pray, should they not elect themselves to such positions, if they have the power to do so? They are perhaps as largely interested pecuniarily in Erie as anybody else. They have placed their money in it, and look to the success of their plans for ultimate returns. Stockholders have voted for them, and expect that their skill and sagacity will at length bring Erie out from its labyrinth of difficulties. They have inaugurated measures of reform, and begun schemes of improvement, which time can only demonstrate to be foolish or wise. It is but natural that they should desire, all other conditions aside, to remain and show the wisdom of what they have done and are doing. Besides, men do not usually let other men manage their money affairs when they can take care of those matters themselves. Mr. Greeley would hardly permit Mr. Fisk to run the finances of the Tribune. Why, then, should Mr. Greeley get so sorely vexed because Mr. Fisk declines to allow him to run Erie? Mr. Greeley for many years stood at the head of the Tribune stock association. He was elected to that position simply because he held a controlling interest in Tribune stock, or had enough friends who did to vote for him. Messrs. Gould and Fisk were elected in just the same way. They are at the head of Erie, because enough Erie stock voted for them to place them there. It is just as uncalled for that Mr. Greeley, or the Tribune, should interfere in Erie management, as it would be for Messrs. Gould and Fisk to protest against Mr. Greeley's election as President of the Tribune association. It is noticeable that nearly all this snapping and snarling comes from those who do not own a dollar of stock.

Still further, it is to be noted that all these suits, involving costly and protracted litigation, drawing away large sums in counsel fees and costs, which should have naturally gone to the improvement of the road—all these suits have come at the instigation of men who had little or no pecuniary interest in Erie.

All the peculiar advantages of the Erie, as a through or local route, are reaped by the traveling public. There would seem to be, therefore, just as little sense in the public lashing itself into a fury of indignation when the majority of stockholders enter no protest, as there is in certain prominent papers meddling in affairs where not pecuniarily interested."—*Gazette*.

Respectfully, S.

Railroad Safety Signals.

AN OLD RULE TO BE REVERSED.

The old railroad system of signals, so far as based upon the theory that if no danger signals is seen all is right, is about to be entirely reversed, thus making it necessary for an engineer to see safety signals at all points of danger before he can pass those points, and not to depend upon or be looking out for danger signals. From a little pamphlet published by Mr. Ashbel Welch, President of the United Railroad Companies of New Jersey, of the committee appointed for the purpose, and termed a "Report on Safety Signals to the Railroad Convention held at the St. Nicholas Hotel, New York," several interesting points relative to this generally new system may be gleaned.

It is stated that at all dangerous points, the arrangements there for safety should be presumed to be wrong unless the engineer has affirmative evidence that they are right, and in such cases safety signals should be used and not danger signals. If a danger signal is relied upon, and by some carelessness of the official in charge, or by some defect of the apparatus or working, it should not be exhibited, the result is oftentimes a fearful one, while had a safety signal been relied upon, nothing worse than a momentary stoppage of the train could take place.

The force of this argument is shown by a recent disaster in a tunnel in England, where a train was run into by one following, the engineer of which saw no danger signal to prevent his entering, and in turn was also run into by still another train. The Norwalk Bridge disaster is quoted, where an engineer, supposing that bridge to be all right, because not shown to be wrong, ran his engine off the draw, which happened to be open. Mr. Welch claims that had the reverse of the rule now generally in use been adopted, no accident would ever have happened.

On important double track lines of railroads the recommendation is made that telegraphic signal stations should be established at regular intervals, and at short distances apart along the road, and each train should be informed by signal on passing such a station whether the preceding train in that direction had passed the next station or not, as in the latter case the following train must not proceed except with great caution. It is stated that no cause of disaster is more frequent on railroads than the running of one train into the rear of another.

The plan above mentioned has been in use for two or more years past between Philadelphia and New Brunswick, on the main passenger route between New York and Philadelphia, and is claimed to be one of the greatest uses in the prevention of accidents.

For fifteen years past there have been used upon the Belvidere (Delaware) road, drawbridge signals which can only be exhibited by the insertion of the bolt which fastens down the latch of the bridge, and thus ensures continuity of the track.

For the crossing of trains over other tracks, where both are on the same grade, a plan in use, after much consideration, at the intersection of the Philadelphia and Trenton and the Reading Railroads, is highly recommended. A hollow cylinder, elevated so as to be seen by all concerned, has four openings, one being each way for each road. A revolving light in the center of the cylinder with two red and two white faces is turned so that

when the white light or safety signal is shown to an approaching train on one road, the red lights meaning danger, are as a consequence shown to the trains on the other road.

It is particularly recommended that railroad companies see that their brakemen are well and warmly clothed, as a brakeman sent hurriedly from a warm car, back upon the car with his danger signal, with the thermometer at ten degrees below zero, and called upon to stand there for perhaps an hour, is a very unsafe guard against danger.

The use of flags is objected to as being liable to be blown edgewise to the observer and not noticed. In their place flat surfaces of tin or wood are recommended.

These suggested rules and regulations, if rigorously carried out by railroad companies, could not fail to be of the greatest service to the traveling public at large.—*New York Evening Post*.

All this is well enough, but it is not comparable to that system of signalling that appeals to the ear, and is electrically worked, such as we have been advocating for months in the columns of the RECORD. The most skeptical person upon this subject, can be convinced of the soundness of our views, if he will only set aside his prejudices and look into the question. We speak whereof we know, and challenge investigation.

If to the system of signalling above proposed, that of the "Electric Alarm" was added, probably, the most thorough and perfect means of avoiding railway accidents by warnings, that human skill and ingenuity can obtain would be secured.

Sooner or later we must come to this combination.

ELEVATED RAILWAYS AND COMPRESSED AIR—Horace H. Day has addressed a letter to Mayor Hall embodying a scheme for rapid transit, which is substantially as follows:

The first question is the motive power, and here, while the system I propose may be carried out by steam, yet a cheaper, safer and better, and one quite free from insurmountable engineering difficulties, is compressed air, giving off its power through engines substantially the same as steam. I propose a wide quay or avenue extending from the east line of the buildings on West street, not less than 150 feet wide toward the North river, and reaching from the Battery to Thirtieth street, and ultimately to the end of the island. On the west side of this avenue I would erect an elevated railway to occupy 75 feet, supported upon suitable piles or columns, having four tracks, leaving the roadway under it, and the other 75 feet for ordinary travel, and without disturbing existing sewer-pipes or other necessary public constructions, including entrance to ferries. Commerce now enters the city on its west side, and this will be always increasing. Already the overflowing and crowding there is almost insufferable, and this wide avenue is a demand of the hour. On the East river side I would erect a similar quay or avenue, 100 feet wide, extending from Burling slip north to Harlem, and thence on to the North river. A branch of this road to accommodate two elevated tracks would pass on to the new East river bridge, to connect in Brooklyn with other branch roads of similar construction, as might be determined on.—*N. Y. Tribune*.

Narrow Gauge Railways.

The subject of railway gauge is once more attracting the attention of the engineering world. It is twenty-five years since the first "battle of the gauges" was fought between the 7 ft and 4 ft. 8½ in. gauge, with the well known result of neither gaining a victory at the time, and of both carrying out their ideas into practical operation. Looking back to that period, it is interesting to read over the conflict once more, and note what the advocates of each had to say of their respective gauges. They were then without any previous experience or knowledge to guide them in deciding a matter of so much importance, and it was, therefore, difficult for them to arrive at a right conclusion. The broad gauge appeared to many the most advisable from the large capacity and steady running of the rolling stock. They did not take into consideration that, though it was well enough for the public, others had an interest and heavy stake in the matter, viz., the shareholders, and that if the latter were not successful the public would also be a loser in the long run. The advocates of the 7 ft. gauge claimed the following advantages by its adoption:

1. Attainment of a high rate of speed.
2. Increased facilities for the use of larger and more powerful locomotives.
3. Admitting low centres of gravity for rolling stock, and giving increased stability and steadiness of motion.

The objections were: 1. The increased cost of construction. 2. Greater weight of rolling stock, and liability of axles breaking from their great length. 3. Greater friction in passing round curves.

As regards the first, it was argued that there was only an excess of 7 per cent. in earthworks and land over the 4 ft. 8½ in., and that the carriages were lighter in proportion to load carried, that in practice axles did not break, and that, as regards friction, it did not hold true with the broad curves set out on the Great Western. It will be noticed that the arguments used at present by the opponents of the narrow gauge are much the same as those formerly used in favor of the 7 ft. gauge and against the 4 ft. 8½ in. gauge. The result eventually was that, though there was some truth in the advantages claimed for the broad gauge, still the objections were much more cogent, and no more lines of that description were constructed. For many years railway promoters were content with constructing lines on the standard gauge of 4 ft. 8½ in. without ever considering whether greater advantages could not be gained by adopting a smaller gauge. Though the high hopes entertained of the great benefits of cheap and quick communication have been fully realized, and the increase in traffic beyond anything anticipated, the return on capital outlay to shareholders is adequate, which has had the effect of stopping investments in railways to a great extent. There are, however, many districts in this country, and large tracts in the colonies, which require railway communication to develop their resources, but there is no prospect that many lines on the existing system will be made, as no return can be expected on the outlay. It appears, therefore, that railways of the future should possess the following capabilities: 1. Moderate cost of construction. 2. Moderate cost of maintenance and working. 3. To have the necessary stability, and to run at speeds required for public despatch, with safety and comfort to the passengers. 4. Ca-

capacity to carry all the traffic required, and available for any increase in the traffic that may eventually take place. 5. Capacity to carry troops, ordnance and military stores, and be available for all purposes during time of war.

As the first and second requirements are governed to a great extent by the gauge, and it has been proved that changes from 7 ft. to 4 ft. 8½ in. are needlessly wide, it is evident that railways on a narrow gauge must be constructed. The question, therefore, is what is the gauge that will nearest fulfill the above requirements? This is naturally a subject of controversy, but it is to be hoped that only one narrow gauge will be decided upon for the same country. From the experience gained with extreme wide and narrow, as well as intermediate gauges, engineers are at present in a much better position to determine the best gauge for the future than was the case when the first had to be decided upon.

In the paper I read before the Inventors' Institute, in 1865, on Narrow Gauge Railways, I advocated a 2 ft. 6 in. or 2 ft. 9 in. gauge for future lines. Since then, I have gone fully into the matter, and taking into consideration that it would be advisable to be able to construct locomotives with inside cylinders, and that in hot countries more space is required for passengers than in temperate climates, and having gone carefully into the dimensions and capacity of rolling stock and the nature of the traffic, I have come to the conclusion that the 2 ft. 9 in. gauge is the most advisable for India, and will fully meet all requirements. From my experience in working the 1 ft. 11½ in. gauge, I deduce the following to show the sufficiency of a 2 ft. 9 in. gauge: 1. That the cost in first construction in earthworks, bridges, tunnels, etc., depends on the gauge. In regard to the construction there is another matter for consideration with Indian lines which is of great importance—that is, being able to lay down a double line of the 2 ft. 6 in. gauge on a single line formation of the 5 ft. 6 in. gauge when required without altering bridges, viaducts, tunnels (as on all the Government lines these are made for a double line), or earthworks, without any extra expense, except laying down the permanent way. 2. That the cost of maintenance of rolling stock and way will be low, consequent of the small weight on each wheel, and less damage to rolling stock in shunting or on collision occurring. 3. That a speed of forty miles an hour can be run with ease and safety, as a speed of thirty-five miles an hour has been attained on the Festiniog Railway. The present working speed is sixteen miles an hour, which I understand is about the standard speed for the proposed Indian lines on 5 ft. 6 in. gauge. Objections have been made to the accompanying plans of horse boxes and cattle trucks on four wheels as not having the required stability and danger of their being blown over by the wind. The formula, however, by which this conclusion is arrived at does not bear a practical test, as will be seen on comparing it with a Festiniog railway carriage. This has a side area of fifty-three feet; the center of wind pressure is at four feet above rail; the weight, when empty, one and a quarter tons. The pressure of wind that it would balance according to formula, would

$$1.25 \times 2240 \times 96 \\ \text{be } \frac{53 \times 4}{126} = 126 \text{ lb. per square foot.}$$

They have, however, stood the severest storm known in this country, without being blown

off the rails at a time when large trees were rooted up.* The amount of pressure necessary to blow a carriage over will also depend on the position of the center of gravity. It is therefore evident that if these carriages, with an angle of stability at $91^{\circ} 31'$, are quite safe, there can be no fear in regard to the stability of rolling stock on the 2 ft. 9 in. gauge, with an angle of $41^{\circ} 30'$. 4. As to the capacity of a 2 ft. 9 in. gauge to carry the required traffic. The Festiniog railway proves that a very heavy traffic can be conducted; the capabilities of a 2 ft. 9 in. gauge in this respect are therefore evident.

To gain adhesion for the secured tractive power to transmit heavy trains at necessary speeds, and rolling stock of the required capacity, the most feasible known plan should be applied, viz., engines on the bogie principle, with four wheel double-bogie frames, or six wheel double-bogie frames, according to the gradients of the line or traffic; and, if need be, with lines of very exceptional gradients and heavy traffic, large quadruple bogie engines, by which means the weight of engines is distributed evenly, and rolling stock dispersed over the line of way, flange and drag friction reduced to a minimum, saving in wear and tear of permanent way, great advantages gained in traversing curves, all of which means money saved in maintenance of way and rolling stock, besides of fuel consumed for a given load. The rolling stock can by this means be made to carry proportionately much more than the usual rolling stock on lines of the ordinary gauge. For instance, the bogie horse-box weighs seven tons, to carry six horses, with two compartments for grooms and fodder, having, when loaded, one ton six cwt. on each wheel, whereas an ordinary horse-box on the 4 ft. 8½ in. gauge weighs six tons, and carries three horses with one compartment for groom, and having, when loaded, one ton seventeen and a half cwt. on each wheel. The bogie cattle truck weighs five tons fifteen cwt. to carry ten beasts, weighing, when loaded, eleven tons fifteen cwt., or one ton nine cwt. to a wheel. An ordinary cattle truck on the 4 ft. 8½ in. gauge, carrying ten beasts, weighs five tons ten cwt., and, when loaded, eleven tons ten cwt., or two tons seventeen cwt. to each wheel. Surely these trucks, with low center of gravity and steadiness secured with easy running on the rails, must have far greater stability and comfort to the beasts than those in use on the ordinary lines. Bogie trucks can be made for the 2 ft. 9 in. gauge of various dimensions and convenient sizes, for carriage of cotton, grain, and coffee, to hold from thirty to forty bales of pressed cotton of four to five tons, and of grain from ten to fifteen tons; in fact, the bogie principle for this gauge affords a wide margin for construction of carriages and vehicles of any description and convenience. The accompanying plans of bogie passenger carriages are for first class, with van to carry thirty passengers, having seat room of 22½ inches for each person, and third class carriage, with van to carry fifty-six passengers, with seat room of 17 inches for each person. The four wheel passenger carriage to carry twelve first-class or sixteen third-class passengers.

I advocate the bogie principle, because I

believe it to be practically the correct one, and which as a rule should form the majority of the rolling stock on narrow gauge lines, not but that bogie engines of one pair of cylinders for express passenger trains, and small four wheel engines for shutting purposes should be applied, also small four wheel trucks to any required extent in combination for light loads of minerals and goods. In the plan of bogie horse-boxes all sagging is obviated by a sufficiently strong framing; nor is there any difficulty of arranging in the detail plans for the girder framing to resist the compressive and bending strains from the action of the buffers. On the Festiniog Railway trains of the four wheel slate wagons are daily pushed or propelled over the Waethnawr embankment, comprising 40 to 120 wagons, without any sagging occurring. Horse-boxes to carry many horses as well as few must have their advantages for horse dealers and for military purposes. To obviate the possibility of a four wheel horse-box being overturned by wind pressure with single horse on lee side of truck, there is no difficulty whatever in arranging the center division of the stalls movable on rollers, and an auxiliary movable partition on one side, which can be used as necessity requires either for one or two horses. In respect to objections made to cattle trucks, it would appear impossible for the cattle to make escapades through the side openings, even though the cant rail was made two or three inches higher, as their heads in rising would come in contact with the top rail or roof. Nor would there be any difficulty in putting the cattle into the truck from the low height of side, as the head would be well in before treading the floor level.

As regards the dimensions of the rolling stock on a line of railway, it is argued that the width ought to be double the gauge. This certainly approaches near to the width of what it should be. On the 1 ft. 11½ in. the width of carriage having floor level above the top of wheels is 2½ times, and on the 4 ft. 8½ in. it is 1½ times the gauge. The Festiniog Railway carriages and trucks run very steady, at a speed of twenty miles an hour, and proved to have the lateral stability even when going over the old rails of 30 lb. to the yard unfinished, when the joints were depressed on one side in many cases one half inch. There is no doubt that the rolling stock at present on the ordinary lines does not give nearly the proper carrying capacity compatible with the gauge. This can not, however, be increased, as the weight already brought upon each wheel is too great, and the rails soon become disintegrated and crushed, lasting only four or five years under moderate traffic, and in cases of heavy traffic at or near stations, only as many months. Steel rails, for durability, have great advantage but at a heavier cost, though even these barely sustain the great weight and impact forces of the engines and rolling stock at high speeds, besides steel against steel has the effect of sooner wearing out the tires. I believe that the maximum weight on each wheel should not exceed three tons.

The trucks on ordinary lines having scarcely any overhang outside the framing, there is no counter-pressure against a collapsing tendency along the center line of floor, but which would be the case when having a proper overhang. A coal truck on the Festiniog Railway is of the following proportions to the gauge: length, 4½ times; wheel base, nearly 3 times; width, 2½ times; and the depth, nearly 1½ times the gauge, carrying 3 tons of coal at a working speed of 15 miles

an hour, the line having maximum curves of 1½ chains radius.

In regard to the capacity of a 2 ft. 9 in. gauge for military purposes, it will be seen from the accompanying plan that heavy ordnance—say two 12-ton guns—can be carried with the greatest ease. The calculated weight is 5 tons 15 cwt., giving when loaded, 2½ tons on a wheel. Trucks of this description would be available for carrying railway bars, bridge girders, etc. Field guns and other war materials can be conveyed in the general goods trucks.

Apologizing for the length of this letter,

I am, sir, yours faithfully,

C. E. SPOONER.

PORTMADOC, Dec. 12, 1870.

—Engineering.

Lake Superior Iron—Its Superior Quality.

A few years ago the idea generally prevailed among iron workers that Lake Superior charcoal pig could not be used successfully in the manufacture of machinery, &c., without a mixture with other metals. Now we have in operation in this district, engines, boilers and machinery of the most massive and elaborate character, made wholly from Lake Superior Iron, and the opinion is gradually gaining strength that it is better adapted to such use than any other iron in the world. In fact the tests that have been made here and elsewhere, prove that while the tenacity of the best Swedish iron is fifty-nine tons to the square inch, English cable bolt fifty-nine pounds and Russian seventy-six pounds, iron made from Lake Superior ores stood at eighty-nine and a half. The freedom of our ores from admixtures with sulphur, phosphorus, or other deleterious substances, give a tenacity unequalled by any other iron known to the trade. The unanimous testimony of all who have tried it is that for certain important uses it is far preferable to any other, both for strength and the ease with which it can be worked.

The Morgan Charcoal Pig, smelted at the Morgan and Champion furnaces, after thorough practical tests in railroad machinery during the past seven years, has won for itself a reputation equal, if not superior, to any iron in the United States. Car wheels, made from the Morgan iron have run successfully tests of two hundred thousand miles, with an average load of ten tons (upon four wheels) over roads having grades of one hundred and sixty feet to the mile, and around curves of nine degrees radius, and upwards; and with brakes set continually for a distance of six miles, in descending the grades and rounding the curves, no wheels having been known to break, notwithstanding the continual friction caused by the rubbing of the brakes against the wheels, and the latter being strained by continual expansion and contraction. Among railroad men, this is considered the severest practical test that can be had.

Locomotive driving wheels made from this iron in the regular form, (without any of the patent appliances,) are as safe from breakage as if made from steel, as many master mechanics and railway engineers will attest; and for all parts of locomotive and car machinery subject to wear, where strength is required, it is much to be preferred. It is sought for by all the first-class railway companies of the West, with whom it finds its principal market.

The Morgan iron is also used extensively in the manufacture of malleable iron ware, and for boiler plate is considered superior to the famed Pennsylvania charcoal pig, of which such great quantities are consumed by eastern manufacturers. Western men however, repudiate the Pennsylvania iron, when boiler plates made from the Morgan Iron Company's

*This is no proof of an error in the formula; but simply a proof that—supposing Mr. Spooner's weights and dimensions to be correct—the Festiniog carriages have not been exposed to the wind pressure exceeding 12.6 lb. per square foot. If they had been, over they would have gone to a certainty. The formula is no empirical one, but is founded on simple and well-known laws.

iron can be obtained. It is also used to a considerable extent for calender rolls, for rolling copper and brass, in the manufacture of heavy steam hammers, anvils and dies; for stamps for the stamping and pulverizing of ores for the refiner; for steam engines intended for heavy work, and for castings for bridges where great strength is requisite and must be had. For the manufacture of steel it has been pronounced by a Swedish iron master equal to the best Swedish iron.

These facts and results have been obtained through the persistent efforts of the manager of these furnaces to produce and place in the markets of the United States an A No. 1 charcoal iron from the far famed Lake Superior ores, the purity of which can not be excelled—a fact which is demonstrated by the continued increase in the production at the rate of from two to three hundred thousand tons annually.

Owing to the increased facilities of this company for supplying this iron, we understand that arrangements are being made by its manager to introduce its best brands into the manufacturing of the Eastern States. When these arrangements are fully perfected we shall make known the fact to consumers.—*Marquette Mining Journal.*

Water Transportation Costly as Well as Slow—Proposed Separation of Passenger and Freight Transportation.

It is becoming a serious question whether transportation by water is not more costly, as well as slower, than transportation by rail, provided the latter is effected with economy. We incline to the belief that the subject of cheap transportation by rail is not sufficiently well understood to entitle popular opinion to weight, even though supported by the vast amount of newspaper discussions which the question of the comparative utility of canal and roads has called out.

In order that freights may be carried cheaply by rail, it is of first importance that the transportation of freights and of passengers be separate and distinct branches of business, which, in a country like this, can not well be harmonized, and for which provision should be made by laying four sets of track, two for passenger and two for freight trains, wherever business would warrant such liberal expenditures. If the experiment is to be tried under conditions favorable to success, new roads will have to be built for the purpose. The network of roads that supplies such excellent facilities for moderately quick travel is only partially adapted to the wants of the country. During half the year the community is dependent upon them exclusively for the transportation of freights, and a very large proportion of freights during this period are the natural productions of farm, forest and mine, which, produced at small cost and commanding a small market value, can not bear the heavy charges which might be borne by products of skilled labor and articles on which the cost of transportation could be evenly distributed. The cheap transportation of grain and produce is indispensable to the development of the vast resources of the interior. The Lake States produce upward of five hundred million bushels of grain annually, and are capable of largely increasing this amount when our export trade shall warrant such an increase; but owing to the present charges for transportation, only a part of the present crop finds its way eastward. But while the Northwest is burdened with a superfluity of breadstuffs which can not be profitably marketed, the cotton planters of the South are beginning to turn their attention to the rais-

ing of food crops. Again, while food is abundant and fuel scarce at the West, the anthracite operators of Pennsylvania have found it necessary to precipitate a strike among the miners.

Suppose a road should be built between this city and Buffalo, in the most substantial manner, and with a strict economy that would make every dollar invested tell in the capacity of the work, to earn a fair profit on capital stock and pay interest on bonded debt. Upon such a road let there be run, at an average speed of, say, eight miles an hour, as many trains as business would warrant—twenty, thirty, or fifty a day. It requires no argument to prove that such a road would have tenfold the maximum carrying capacity of a road managed under the present system, which mixes the business of freight and passenger transportation. A large amount of rolling stock would be needed, but the proportion of engines to cars would be relatively greater than on other roads, since it should be open to all to run cars over it upon the payment of traction and mileage tolls. Were the business of forwarding thus left to private individuals or companies, the competition for freights would be so active as to secure low rates. Thus relieved of the trouble and expense of maintaining a large assortment of passenger and freight cars, and responsible only for the permanent way and engines, a road could be kept in repair and managed at a comparatively small annual expense. No difficulties would be encountered that could not be readily overcome. Its traffic would be controlled by the company owning and operating the road, under a system of management that would secure uniformity of speed and prevent any confusion. There can be no doubt that freights could be moved more cheaply and with far greater rapidity by such a route than by canal, and that, at moderate tolls, the company owning and operating it would derive a larger net revenue than could possibly be earned by any road of equal length on the present system.—*New York Iron Age.*

IMPROVEMENT IN PRINTING MACHINERY.—The circulation of our prominent newspapers has increased lately to such an extent, that presses not long ago considered *fast*—and which could easily print ten to twelve thousand sheets an hour—are now deemed old foggyish, and are insufficient for the purposes of a first-class daily journal. To meet the exigencies of an increasing trade, Mr. George W. Childs, proprietor of the *Public Ledger*, some time ago ordered of the Messrs. Hoe a new printing machine for his newspaper, which, when completed, will enable the establishment to turn out 65,000 copies per hour. The new press will cost, we are informed, upwards of \$10,000, and will be ready for use in two or three months. This action has been rendered necessary, we are glad to say, by the steady increase of the circulation of our contemporary, which, we have the best reason to know, prints a regular daily edition of 74,000 copies.—*Philadelphia Dispatch.*

The number of paper mills now existing in the principal States of Europe is as follows: Great Britain, 408; France, 276; Germany, 243; Austria, 78; Russia, 40; Italy, 30; Belgium, 26; Spain, 17; Switzerland, 13; Sweden, 8; Turkey, 1. In the United States of America there are 535 paper mills. The annual production of paper in Europe is 8,956,000 cwt., valued at £15,004,000.

The *Detroit Post* says: Old wooden water pipes were recently taken out in Woodford avenue, laid there forty three years ago. The wood is apparently as sound as ever, showing no signs of decay, even retaining the bark, and on cutting through the wood the timber was found as bright and as sound as ever. The pipes were made of tamarack logs, about sixteen feet in length, and eight or ten inches in diameter. These pipes were disconnected from the distribution pipe several years ago. They were imbedded in clay at a depth of four or five feet.

The purity of hydrate of chloral, may, it is said, be tested by means of a concentrated solution of potash. The pure hydrate does not color this at all, or at most only a feeble yellow, and gives forth the pure smell of chloroform. Should the liquid assume a brown color, and the smell of chloroacetic acid be combined with that of chloroform, or should gasses of a pungent odor be developed, which is not seldom the case, the product is impure and unfit for use.

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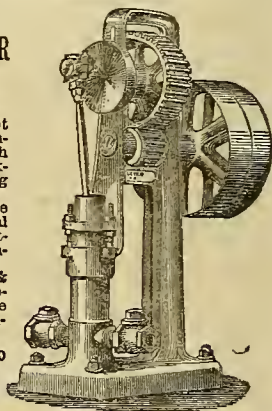
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CHAS. S. HELLER.

PHILADELPHIA, August 1, 1870.

29-2-70, 27

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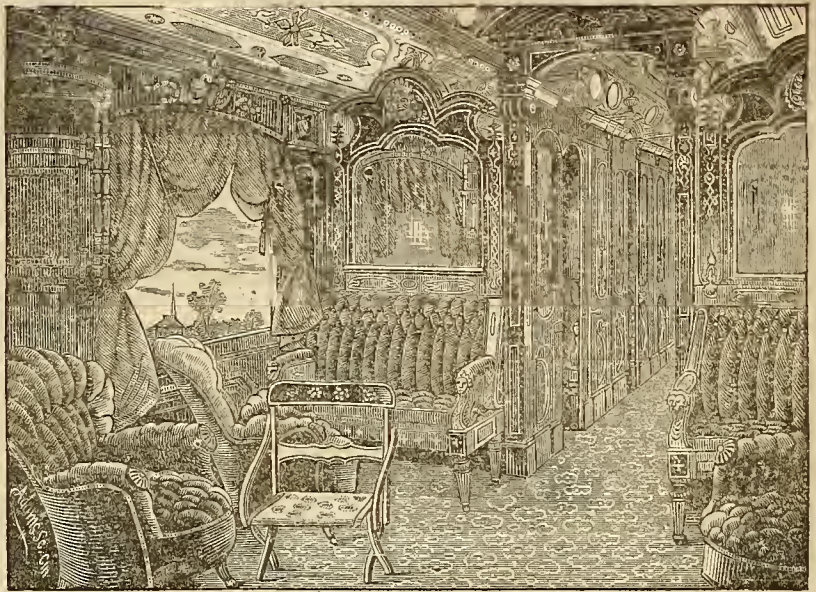
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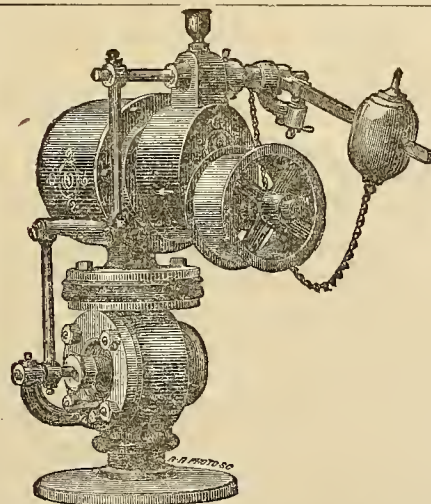
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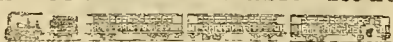
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The Railroad Record.

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CINCINNATI, - - THURSDAY, MARCH 9, 1871.

The Dayton & Cincinnati Railroad.

IMPORTANT DECISION.

The following is the decision of the Superior Court of Cincinnati, in full bench, upon the case so long pending, in which the question of the validity of the sale of that part of the road from Sharon to Dayton, to the Cincinnati, Dayton & Eastern Railroad Company, was contested.

It is interesting to both lawyers and railway managers:

GEORGE E. DONNER, &c. } *In General Term.*
1605 vs. Reserved.
THE D. & C. R. Co. } Feb. 7, 1871.

HAGANS, J.: In February, 1847, 1848 and 1849, the Legislature passed several acts by which the Dayton & Cincinnati Railroad Company became incorporated. It was known generally as "The Short Line Railroad," and is so designated. It had power to construct a road from Dayton to Cincinnati, though in the first two acts it was called by other names, and was authorized to construct roads with different termini. The Board of Directors was made "competent to transact all the business of the corporation," and to issue and sell bonds, &c., and made capable "to have, purchase, receive, possess, sell, convey and enjoy real and personal estate," &c., and the right to complete any part of the road and put it in operation which the interests of the road may require to be first completed.

The company was duly organized, located its road, and commenced work in 1852, and in April, 1853, a mortgage upon the entire line from Dayton to Cincinnati for \$1,000,000 was made to Wm. J. McAlpin and Peter Odlen, trustees, to secure the bonds of the company to that amount, and 72 of them for \$1,000 each were sold or disposed of in the same year. It appeared that about \$700,000 obtained principally from stock subscriptions, had been expended within three miles of Cincinnati, chiefly on what is known as the Short Line Tunnel, and that this was about the whole expenditure of the company in the construction of the road.

The company became insolvent and unable to proceed with the work. Donner and others, plaintiffs, owned 33 of the mortgage bonds of the company, brought suit, in May, 1859, to foreclose the mortgage and obtain payment of these bonds, and on motion a receiver was appointed to take charge of the unfinished road and other property of the company, and the

plaintiffs obtained judgment and execution in 1860 for nearly \$44,000. To the petition sundry judgment and other creditors were made parties, and filed answers and cross-petitions, and, among other things, sought to subject unpaid stock subscriptions to the payment of their judgments.

In this state of affairs, the Cincinnati, Dayton & Eastern Railroad Company, known as the "Eastern road" and so designated for convenience, became the owners by assignment from the plaintiffs and others, both of the judgment they had obtained and also of the bonds of the Short Line company, upon which the judgment was founded, to the number of 65, in all 65,000, and accrued interest. Donner had no decree for sale at the time, but was pressing his claim in judgment against the Short Line company, while other creditors by judgment to a large amount were doing the same, the company being utterly insolvent, as is alleged. It appears that on the 28th July, 1865, the Short Line company, up on the previous action of the Board of Directors appointing two of the members of the board for that purpose, sold by written agreement and conveyed to the Eastern company by indenture in due form, reciting its ownership of the right of way it had acquired, and other rights for side tracks, depots, stations, &c.; that it had been engaged at work chiefly near Cincinnati, where it had expended a large amount of money arising from stock subscriptions; that it had incurred liabilities for borrowed money, existing in part in its mortgage bonds, *secured on its entire road and property*; and that proceedings in foreclosure to sell the road were pending, and it had not the means or credit to complete the road, but was in imminent danger of having its *entire road sold* under the proceedings aforesaid, in consideration of \$55,000 cash received, and of further covenants, the Short Line company agreed to sell in writing, and did by indenture, this agreement being made part of it, give, grant, sell and convey and confirm to the Eastern company, its successors and assigns, all its right, title and interest in and to so much of the right of way, roadbed and ground appropriated or intended for side tracks, depots, stations and other appurtenances of the same in its full length and breadth, as extends and is situate in and from the city of Dayton, in the county of Montgomery, to the town of Sharon, in the county of Hamilton, including all its said line and appurtenances, situate and lying between said termini in Dayton and Sharon; and also the right to locate, construct, maintain and operate, for the exclusive and perpetual use of said part (the Eastern company), its successors and assigns, a single or double track of rails on and along that part of the right of way and roadbed of the Short Line company which extends from the town of Sharon to the point where said roadway intersects the road

of the Marietta & Cincinnati Railroad Company. It is expressly understood, nevertheless, by both parties to this indenture, that the same is not intended, or to be construed, to pass or include the capital stock of the Short Line company, or any part thereof, whether paid or unpaid, or the franchises of the Short Line company, or the vendees of its right of way or its other property not hereinbefore granted, but the same are reserved and retained by the Short Line company.

The agreement referred to in the indenture bears date the same day, and provides, in addition to the consideration of the \$55,000 cash paid as set forth in the deed above recited, that the Eastern company shall keep the Short Line company, in so far as regards the directors, stockholders, and all the franchises and property not included in that conveyance, harmless and indemnified against the payment or liability to pay or be made answerable upon the mortgage bonds of the Short Line company, and interest, whether in judgment or otherwise, then owned and held by the Eastern company, to the amount of \$65,000, naming and numbering them: "it being understood that neither the said bonds, or the interest, or the coupons thereon, or the judgment rendered on them, or the mortgage by which they are secured, are in any manner paid or satisfied in whole or in part by this contract; but the same are to remain in full force, capable of being at any time made operative and available, either to protect and confirm by sale or otherwise the title" of the Eastern company "to the right of way and appurtenances hereby sold, or in case of the failure of the title conveyed by said" the Short Line company "as herein stipulated, then to become fully operative against the said" the Short Line company, "and all its property and franchises, in as full and ample a manner as if this contract had not been made." Upon the happening of the same contingency of failure of title, the agreement provided for the repayment, or security therefor, of the \$55,000 paid as part consideration of the conveyance. The \$55,000 paid in money, it is alleged, was distributed among the creditors of the company.

Upon this security, the Eastern road, in November, 1866, issued mortgage bonds to the amount of \$2,000,000, few of which are outstanding, the balance having never been negotiated. But the Eastern company before the year 1870 turned over all its rights in the agreement and property conveyed to it by the Short Line company to the Sandusky road, which, by reason thereof, as the testimony shows, has made a running arrangement at a considerable profit with the Cincinnati, Hamilton & Dayton Railroad Company, which is operating a line of road from this city to Dayton by way of Hamilton, and, as may be supposed, the Eastern company does not intend to do anything with the property it owes by

virtue of this conveyance from the Short Line Company.

In this suit various entries were made and proceedings had, until in March, 1870, a decree for sale was entered in behalf of the Cincinnati, Dayton & Eastern company, on the bonds held by them, and motion was made to set the same aside. It seems an appraisal of the property mortgaged was made under an order of sale issued, at \$270,000, but an order was entered staying proceedings until the determination of the motion to set the decree for sale aside, which was afterward done.

A number of large stockholders in the Short Line company, owning 966 shares, shortly after the consummation of this sale, viz: on the 16th October, 1865, brought an action in this court to set aside the conveyance and to restrain the Eastern company from doing any thing under it. While this suit was pending, the majority of the stockholders of the Short Line company executed a paper in which they state that the plaintiffs in that suit do not represent the subscribers to the paper, and that "they approve of the sale and decree that the same shall be in all things confirmed, and are ready to give their assent in any form. They are satisfied that said sale was necessary and judicious, and they regard it as highly beneficial to the stockholders and creditors of the said Short Line company."

In this case both corporations file answer in 1865, in which they both allege that the plaintiffs represent the only stock out of 8,459 shares opposed to the sale, and they both ask the court to affirm it.

On a hearing of the cause, in April, 1867, a temporary restraining order was allowed in this cause, on the plaintiffs executing bond in \$1,000, which was never done; and on the 19th March, 1870 a final decree in favor of the plaintiffs was entered, and a motion to set that decree aside duly made, and afterward granted.

In 1869, Richard Mathers and Samuel Beresford, executors of George Mathers, deceased, filed a creditor's bill upon a judgment they had obtained against the Short Line company, and alleging the same was a lien on all its property, and upon which they had levied an execution. To this action the plaintiffs made the Eastern company and the other creditors parties. They alleged that the sale to the Eastern company was void, and asked a marshaling of liens and a sale of the property of the Short Line company. To this petition, among other answers, is one filed by the Eastern company, on February 20, 1870, in which its ownership of 66 of the mortgage bonds of the Short Line company, including those in the Donner judgment, is set up, the provisions of the mortgage to McAlpin and Odlin stated, the priority of the lien asserted, and prays that in case any sale is made, that its rights may be ascertained and determined, and the amount of its bonds and interest be

first paid out of the proceeds of the sale, and other relief. Not a word is said in this answer, it will be observed, about the contract, the sale and conveyance to this defendant by the Short Line company of July 28, 1865, nor of the fact that it had, before this answer was filed, disposed of all its interest in that agreement and purchase to the Sandusky road.

To this answer a reply is filed, that the effect of the sale and conveyance by the Short Line company to the Eastern company, on July 28, 1865, was to satisfy and pay said mortgage bonds held by the Eastern company as it alleges.

No answer appears to be filed by the Short Line company in this case.

At the April term, 1870, these causes on motion, were consolidated, and then, at the January term, 1871, came on for hearing, and the causes together with the testimony taken before the judge at the trial, were reserved to this court.

It appears farther from the testimony, that immediately on the completion of the agreement of sale by the Short Line company to the Eastern company, that they set about resurveying the line from Sharon to Dayton, changed the route in some places, surrendered the old rights of way and took new ones, and took new stock subscriptions from the holders of stock in the Short Line company, which was surrendered, and were about to contract for the building of the line, when, as they allege, the injunction allowed in the Coleman case stopped the project, and made it necessary to abandon the enterprise; but certainly before that time the Eastern company had become merged in the Sandusky company, which by means of this very property made a very advantageous running contract with the Cincinnati, Hamilton & Dayton company. For the evidence shows, that it was the imminence of the contract to build this road, that brought the Cincinnati, Hamilton & Dayton company to terms. Rush R. Sloane was and still is the President of the Eastern company, as he claims, and as such holds the 66 bonds of the Short Line company, payment of which he demands. But it has not escaped the attention of the Court, that he is and has been also the President of the Sandusky road, which has reaped and is now reaping all the very profitable advantages, larger than its cost, of having held the property of the Short Line company as a means of obtaining its entrance into Cincinnati over the Cincinnati, Hamilton & Dayton company, much cheaper than the construction of an entrance of its own.

The contract, sale and conveyance of July 28, 1865, as between the Short Line company and the Eastern company, must be held binding and valid. It does not appear well that the Eastern company, after insisting in two answers that the contract is valid and binding, and having in the meantime given the Sandusky company the benefit of the same,

by which it has obtained a very valuable advantage, larger than its cost, to come in the same action in 1870 and set up the mortgage bonds and ask that they be paid again by a sale of all the corporate property and franchises of the Short Line company, and by consequence be entitled to recover back the \$55,000 cash which they had paid for the property they have and are now enjoying, and which has long since been distributed to the creditors of the Short Line company. If there were nothing more in this case than this, we should hold it to be equitable to deny a sale on the prayer of the Eastern company to satisfy these bonds.

Again, although the contract provides that only in the contingency of failure of title to the part of the property conveyed, the Eastern company may set up this claim. In any other case, the bonds were to be used to make the conveyance operative and available. It would be unjust to allow them to so use and reap the advantage of the property embraced in the contract as to make it the interest of this company to demand and insist upon a sale of the entire corporate property of the other party to the contract, as though the title to the property conveyed had failed. We prefer to make these bonds operative and available, according to the contract as to the property conveyed, and leave the parties where by the contract they have placed themselves, and to hold the conveyance and subsequent use of the property as a satisfaction thereof. The propriety of so holding is sustained by the acquiescence of both companies for a period of some four years.

The cause of *Coleman and others*, however, fairly presents the question of the validity of the contract of July 28, 1865.

It will be observed that this contract embraces only the corporate property of the Short Line company, and expressly excludes the capital stock, the franchises of the company, the residue of the right of way and other property of the company. It is admitted that the Short Line company had expended mainly all its means on the three miles of its line, including the great tunnel, near and in this city, and was unable to proceed with the work, was largely in debt, was harassed with suits and judgments and taxes to a large amount, which it was unable to pay, and that its creditors, knowing the practical insolvency of the corporation, were pressing for payment and threatening to sell the whole property, which must have resulted in a fatal sacrifice and loss to the proposed road. The embarrassments surrounding the enterprise at the time were insurmountable. The directors of the company, to rid themselves of the most pressing of these demands, to save that portion of the property which was the most valuable to all parties, because the most of its means had been expended there, by this sale, made with the assent of all its stockholders except these parties, in fact, preserved the enterprise from ruin, and paid off one hundred and twenty-one thousand dollars of debts, leaving still in the hands of the company the only available and valuable property it ever had. The proceeds of the sale went to the creditors of the road, and was unquestionably

highly advantageous to the stockholders and other creditors of the company. The transaction presents, therefore, a strong claim that it should be upheld.

It is objected that this sale was destructive of the company. We do not think there is much force in this objection. The corporation is certainly not extinct. It may be that the Short Line company may yet have the power to build its road to Dayton by another route. It may even repurchase very cheap from the Eastern or the Sandusky company the property sold, or its use, which has ceased to be valuable to them. The conveyance of the right of way was not the grant of a franchise, but of one of the means by which a franchise may be enjoyed and passed by the conveyance. The Eastern company, it is admitted, had the unquestionable right to obtain what it did. For it has a franchise to construct and work a road from Dayton to Cincinnati, and there is no reason why it may not purchase a right of way of the Short Line company, as of individuals. It was simply a perpetual easement, and all the conditions upon which the right of way was originally obtained were neither defeated or violated. (*Junction R. R. Co. v. Ruggles*, 7 Ohio St. 1; *Coe v. Col. & Ind. R. R. Co.* 10 Ohio St. 384; 1 Redfield on Railways, 247-251.) Besides, by the charter, the company had the right "to commence, complete and put in operation any part of said railroad." The disposition of this property does not therefore destroy the enterprise.

An examination of the charter of the Short Line company shows that it had the necessary power to obtain the right of way and to make the conveyance in the form and manner it did. (2 Redfield, 692.) But it is again objected that the whole matter was done by the board of directors. Besides the general power of the directors over the corporate property conferred expressly by its charter, we think the Supreme Court of Ohio, in the case of *Hatch v. The Cin. & Ind. R. R. Co.* 18 Ohio St. 92, and *Goodin v. Evans*, 18 Ohio St. 167, where this point was made by counsel in the argument. In the first of those cases, the grantee was not complaining of the transaction on that ground, so here the Eastern company can not complain as we have seen. It was Hatch who complained of the want of power of the board of directors to make the conveyance of the Whitewater Canal to the Cincinnati & Indiana Railroad Company, and for that reason claimed that the land had reverted to him, and that its value was the measure of his damages. In the second of these cases, the power of the board of directors of the Short Line company, under that clause of its charter which empowers the directors "to transact all business of the corporation," passed under review. And it was held that the board of directors might, without referring the question to the stockholders, accept the provisions of the 14th section of the Act of 1848, by which they had taken subscriptions of real estate to its capital stock, though they had no right to take such subscriptions under the original charter. Adapting the language of the Supreme Court in that case to this, we may well say: "From the nature and character of this sale, there would seem to be no necessity for referring the question of sale to the stockholders. The disposition of the corporate property was not intended by the Legislature to be confided to the individual corporators, but to the corporate body." The charter states that the directors shall be "competent to transact all business of the corporation." This sale, then, was business of the corpora-

tion, which the directors were made "competent to transact." It would seem that the stockholders could not have sold and transferred this property. No one was competent to do it but the board, at least, if the stockholders could do it so might the board; and this would seem to be conclusive that this contract was not *ultra vires*. The subsequent assent and acquiescence of all the stockholders, except those joining Coleman in this suit, representing but a very small minority, furnishes strong reason for declaring this sale to be valid, as in the judgment of these stockholders the transaction was to the great advantage of all the creditors of the corporation. And certainly, if the board had the power to contract, under the circumstances shown in the testimony, it was their duty to do so, if thereby they could at once satisfy the most clamorous of the creditors, and pay their claims, and still have all that was really valuable in the enterprise, as far as they had carried it.

But it is said, the property of the Short Line company was in the hands of the receiver of this Court. Having found that this contract was not illegal, we do not see how the mere fact that the property of the corporation was in the hands of a receiver can affect it. While he represents the rights of both creditors and stockholders, he can only assert them when they are affected by the fraudulent or illegal acts of the board of directors, and may repudiate illegal transfers of property by the directors acting in the name of the corporation. (*Edwards on Receivers*, 141.)

A number of cases were cited to us in argument, but we find nothing fairly opposed to the views we have expressed, and a decree may be taken accordingly.

*Burnet & Follett,
Caldwell, Coppock & Caldwell,
King, Thompson & Avery,
R. B. Warden, Wall & Disney,
Durbin Ward, Tilden & Mizwell,
For parties.*

The Southern Railroad.

We give a large portion of our space this week to the following able speech delivered in the Kentucky Senate upon questions that grow out of our Southern Railroad Bill. It will repay a careful reading:

The Senate having under consideration a bill from the House of Representatives entitled "An act to authorize the Trustees of the Cincinnati Southern Railroad to acquire the right of way, and to extend a line of railway through certain counties in this commonwealth," and the question being on the passage of the bill, Mr. CARLISLE addressed the Senate as follows:

MR. SPEAKER, I had not determined until this moment to trouble the Senate with any remarks upon this bill. It had been my purpose to submit the question on the passage of this measure to the vote of the Senate, so far as I was concerned, upon the discussion which has already taken place; but reflection has satisfied me that justice to myself and to the people whom I represent, demands that I should say a few words in vindication of my course with reference to it, and in refutation of the charge so frequently made here and elsewhere, that we were asking the General Assembly to do something inconsistent with the dignity and honor of the State. I regret

my want of preparation, and feel many misgivings as to my ability to do anything like justice to the subject under the circumstances; for I speak, sir, without any hope or expectation of influencing to any extent the result of the vote about to be taken. But it seems to me that the highest tribute the friends of this measure can pay to the intelligence of its opponents, is to submit for their consideration the reasons which have constrained us to give it our support. It is my purpose to do this as briefly and concisely as possible, without elaboration or rhetorical display; and if the arguments are justly entitled to any weight, it is difficult for me to believe that the gentlemen who are now opposed to the bill will refuse to listen to them or to give them a careful and unprejudiced consideration. This much is certainly due to the friends of every measure presented for the action of the general assembly, and this the friends of the present measure confidently expect will be accorded to them. Although my constituents and the entire section of the State to be affected by the construction of the proposed road are deeply interested in behalf of this bill, I shall make no appeals to the Senate not based upon what I conceive to be sound arguments and proper considerations of public policy. That this is a matter of very vast importance, not only to a large, populous and wealthy portion of our own State, but also to the people of Tennessee, Georgia, and other sections of the South, appears to be very generally conceded, even among its opponents. The importance, and in fact the absolute necessity of this measure to at least one-third of the people of Kentucky, have been so fully and clearly demonstrated by the gentlemen who have preceded me in this discussion, that it would be a useless consumption of time to dwell at any length upon that aspect of the question. I could add nothing to what has been so well said by the Senator from Boyle (Mr. TALBOT) in the speech which he has just concluded. When the people of so large a portion of the State, numbering not less than seventy-five thousand qualified voters, and representing in an eminent degree the virtue and intelligence of all classes of our population, are almost unanimously appealing to us for the passage of a measure which affects them and their material interests almost exclusively, a proper respect for their opinions and claims demands that we should give them a fair and impartial hearing with a view of granting them such relief as we can consistently with our honest convictions of public duty. We are not at liberty to presume that such a people have misunderstood their own true interests, or that they have overlooked or failed to appreciate the interests of their fellow citizens in other portions of the State. However important and desirable the growth and development of their own region of country may be to them, I am satisfied that they would hesitate long before asking the representatives of the people to give their sanction to any measure of internal improvement inconsistent with the rights, honor, or general welfare of the State, or calculated in the slightest degree to impair the prosperity of any considerable number of its inhabitants. They want no exclusive privilege or unusual special legislation in derogation of the rights of others, but they do demand and have a right to demand that equal and exact justice shall be done to all without reference to geographical position or local prejudices.

Although this has been presented somewhat in the form of a Cincinnati measure, and has been constantly characterized as such

by its opponents, it is well known to every body, and to none better than to the Senators upon this floor, that it did not originate in that city. It is not at all necessary to go at length into the history and results of the efforts that have been made from time to time by the people of Kentucky and of the South, to devise some means by which they could secure the construction of a great trunk line of railway to connect the Northern and Southern systems, and yet it can not be altogether inappropriate to allude briefly to some of the more recent movements that have been made in that direction. The great necessity of such a road, and its almost incalculable value to the people of the South, has been felt and appreciated for at least thirty years. The agitation of this subject first commenced, I believe, in the State of South Carolina. Public meetings were held at Charleston and perhaps elsewhere in that State, the subject was thoroughly discussed in the public press and otherwise and a delegation composed of her best known and most influential citizens was appointed to visit Kentucky and the city of Cincinnati for the purpose of presenting the merits of the enterprise and securing co-operation and aid in its presentation. The appeal was made to our people and the people of Cincinnati, but the attempt to secure the necessary means failed. The project, however, was not abandoned, but was kept alive in the public mind of both sections, not only by the constant necessity which existed for such a means of communication, but also by frequent attempts on the part of business men to devise some plan by which this great defect in the railroad system of the country could be remedied. But until within the last two years it seemed that all their efforts would prove unavailing, and that the commerce between the two sections would be forever compelled to follow the expensive and circuitous routes already constructed and in operation. About two years ago, however, the necessity for this road was felt to be so great that the people of Kentucky, Tennessee, Georgia, and Alabama, determined to make one more united and vigorous effort to secure it. Large and influential delegations of business men from a majority of the counties named in this bill, and from various other counties in the State, as well as from the States lying south of us went to the city of Cincinnati and made an appeal to her people for assistance. These delegations represented the substantial commercial interests of their respective localities. They were accorded a respectful hearing by the city authorities and by the citizens and committees representing the various trade organizations of Cincinnati. I know of my own personal knowledge that for weeks the committees of the City Council and the Board of Trade and Chamber of Commerce listened patiently and attentively to the arguments and appeals of these gentlemen. The merits of various routes were strenuously urged by the delegations representing the country through which they would pass; the advantages of different cities in the South as termini of the proposed road were presented and discussed by the delegates in person and through the public press; large donations of land and money were pledged on the part of counties and cities competing for the location of the road, and every proper argument and appeal that could suggest itself to the minds of earnest and able men was pressed upon the consideration of the committees. This sir, was the origin, the very beginning of the measure now pending for our decision. It came from Kentucky and

the South; and it was urged upon the attention of Cincinnati with all the eloquence and powers of persuasion which the chosen representatives of Kentucky and the South could command. The result was the passage by the General Assembly of the State of Ohio of the act which was approved May 4, 1869, entitled "An act relating to cities of the first class having a population exceeding one hundred and fifty thousand inhabitants." This is what is commonly called the "Ferguson bill." Perhaps sir, no public measure has ever been more generally misunderstood and misrepresented than this one. It has been urged again and again, inside and outside of the Legislature, as an objection to the bill under consideration that if the proposed road should ever be constructed, it would be managed and operated by the city of Cincinnati or her trustees, and would be used exclusively in the interests and for the benefit of that city to the prejudice and perhaps destruction of the trade and property of a city within our own limits. In fact, this idea has constituted the staple—the very substance—of all the arguments that have been made against the bill. It is the foundation upon which the whole opposition rests for its support. That it is an erroneous view of the subject can be seen at a glance by any gentleman who will take the trouble to read the provisions of the Ohio act. By the provisions of that act, whenever the city councils of any of the cities to which it applies shall declare by resolution that a line of railway is essential to the interests of said city, a board of trustees shall be appointed with authority to borrow money for the purpose of constructing such railway, and to issue bonds in the name of the city not exceeding in amount the sum of ten millions of dollars. The Trustees are to be appointed by the Superior Court of the city if there be one, and if not, by the Court of Common Pleas, upon the application of the city solicitor, and they are required to execute the bond with surety for the faithful discharge of their duties. But before any appointment can be made, or any proceedings had, except the mere preliminary action of the city council, the law requires the question of providing the line of railway to be submitted to a vote of the people. By the third section of the act, the gentlemen who may be appointed by the court, and their successors, are made the trustees of that fund of ten millions of dollars, which they are to expend in procuring the right of way and in constructing a line of railway between the termini designated by the city council; and by the ninth section it is expressly provided, that as fast as portions of the road are completed, the trustees may lease the right to use and operate such portions, and upon the final completion of the whole road it is made their imperative duty to lease the right to use and operate the whole line to such person or company as will comply with the terms and conditions that may be prescribed.

I have stated fairly all the provisions of that act bearing upon the question involved in the objection to which I have just alluded, and I submit it to the candid judgement of every lawyer and jurist in the land whether these trustees possess any power whatever under that act to use and operate a road as the representatives of the city of Cincinnati. It seems to me that there can be but one answer to the question. It is answered by the positive provisions of the very law under which they were appointed, and from which they necessarily derive all their powers. They are simply trustees of a certain fund, and the whole extent of their power is to issue and

negotiate the bonds upon which that fund is to be raised, and to expend the money in the construction of a line of railway. Not only does the act fail to confer upon them any power to use and operate a road, but it by almost necessary implications prohibits them from doing so, because it provides that they shall leave it when completed. No one, I presume, will controvert the proposition that these trustees and their successors must look alone for a definition of their powers as fiduciaries to the provisions of the law from which they derive their authority. Their powers and duties as representatives of the city are specifically enumerated in the law, and the power to operate a railroad is not among them. We do not propose, even if we could do so, to enlarge or add to these powers. The bill under consideration is in perfect harmony in this respect with the Ohio act, and contemplates a leasing of the road by the trustees when it shall be finished. It must, therefore, according to the requirements of both acts, pass out of their hands into the hands of a lessee or lessees. If any citizen of Kentucky, or any association or company composed of citizens of Kentucky should desire to lease and operate the road, ample opportunity will be afforded them to do so. Competition for the privilege of leasing and running it will be open to all the world. What then becomes of the argument which has been so earnestly and persistently urged in the Legislature and before the people? Will it be seriously contended that the lessees will run the road exclusively in the interests of Cincinnati, or that they will make unjust discriminations against our people and our other railroads and cities? I shall undertake to show hereafter to the entire satisfaction of any unbiased mind, that they will have no power to do so under the provisions of this bill, even if they desired it. But what motive could they have to operate the road at a pecuniary loss to themselves by carrying the merchandise or agricultural products of one city or section at so low a rate as to injure or destroy the trade or business of another city or section? It is unreasonable in the highest degree to suppose that they will be willing to sacrifice their own pecuniary interest merely for the purpose of promoting the prosperity of one place and diminishing the trade and growth of another. No sir, we need have no such apprehensions. They will be actuated by the same motives of profit and gain which have from time immemorial governed the owners and managers of lines of public conveyance upon which the people have been compelled to rely for the means of transportation. As I have said, by the terms of the Ohio act the question of providing a line of railway was required to be submitted to a vote of the people before any trustees could be appointed or any bonds issued. Under the resolution of the city council, and the proclamation of the Mayor, it was submitted to the people of Cincinnati at a special election ordered for that purpose, and by a majority unprecedented in the history of that city, a majority of more than ten to one, they declared in favor of the proposition to tax themselves to pay the interest and principal of ten millions of dollars, to be used in the construction of the road. This is the manner in which they responded to the appeals of Kentucky and the friends of the road in the South. The affirmative vote upon this question represented to a very large extent the wealth and commercial and manufacturing interests of that great city. It was intelligently cast after a thorough discussion of the whole subject in all its aspects pecuniary and

legal, and is entitled to be received as an expression of the deliberate judgment and purpose of the people. Clothed with the authority conferred by the general assembly of the State of Ohio, ratified and sanctioned by the votes of the people and the judgments of their courts, these trustees present themselves before the Legislature of Kentucky and respectfully ask at our hands the privilege of acquiring the right of way and constructing this great trunk line of railway through our territory. But sir, unexpectedly to them and to the great mass of people directly interested in the construction of the road, they have met from the very beginning with opposition of the most serious character, and that too almost exclusively from sections of the State whose interests can not possibly be injuriously affected by the success of their enterprise. They have not asked you to give them an act of incorporation, or to exempt them from any of the burdens or responsibilities imposed by law upon the citizens and companies of our own State, or upon foreign companies doing business here. They present themselves simply as the representatives and fiduciaries of a corporation already created under the laws of Ohio, and they seek only our consent that they may discharge the duties imposed by their trust within the limits of our jurisdiction. Sir, other foreign corporations have not been so respectful, but relying upon the law of comity alone, and without the express sanction of Legislative enactments, they have come into your State from every quarter, North, South, East and West, and have opened offices and proceeded to transact their corporate business. Not one of them has ever been driven out or molested. On the contrary, our settled policy has rather been to protect and encourage them. But now, for the first time in the history of the State, the representatives of foreign corporations came before us and offered to submit themselves to the exclusive jurisdiction of our courts, and to the supervision and control of our Legislature in order that they may secure the simple privilege of expending ten millions of dollars of their own money in the construction of a much needed public improvement which will certainly be fully as beneficial to the people of Kentucky as it will be to them. And this privilege sir, we are about to refuse. Upon what grounds of public policy or equal justice we are to justify this refusal, either now or hereafter, I confess myself unable to imagine. For my own part, I do not hesitate to avow it as my opinion that these gentlemen have a perfect legal right to acquire title to a strip of land one hundred feet wide, or two hundred feet wide, if they see proper, through any part of Kentucky and construct a railroad upon it.

There is no law in Kentucky or elsewhere, so far as I know, to prohibit any man or association of men, whether citizens of the State or not, from purchasing land and constructing a railroad upon it any more than there is to prohibit the erection and operation of a mill or manufacturing establishment. Every man has the right to purchase and hold real-estate and to erect and maintain on it what he chooses, provided it is neither a public or private nuisance. There is no legal power deposited anywhere to prevent it, nor is there any legal process which could be used to hinder or delay it. Of course they would be compelled to acquire the necessary land for the location of the road by private contract exclusively, and could not proceed legally to condemn and appropriate the property of an unwilling owner. They would encounter legal difficulties only when they should find it

necessary to acquire lands owned by infants or other persons laboring under legal disabilities. The idea that the grant of a franchise is absolutely essential in order to authorize the construction and operation of railroads, can not be supported by sound reason or respectable judicial authority. But these trustees have not chosen to resort to this course, which I admit would have been somewhat unusual. They have been elected to make their application here to the representatives of the people, and to designate in the bill which they have presented precisely what powers and privileges they desire to exercise within the State. How has their application been received, and what kind of consideration has been given to their bill? What arguments have been addressed to the Legislature and the people in opposition to it? We have heard many appeals to prejudices which should have been long since allayed, and much declamation about the honor and dignity of the State, but the real arguments have been few, and based upon a total misapprehension of the active provisions of the bill. I question no gentleman's motives; I deny no gentlemen's right to differ from me upon any matter of public concern. On the contrary, I cheerfully accord to all the opponents of the bill the same measure of integrity and devotion to the public weal that I claim for myself. It seems to me that we differ so widely upon the present occasion simply because we do not understand the provisions of the bill in the same way. Why sir, I have been informed that remonstrances against the passage of this measure have been extensively circulated and numerous signed in various parts of the State, based entirely upon three palpable misapprehensions of the bill. In the first place it is stated in three remonstrances, as I am informed, that no jurisdiction whatever is reserved to our courts over actions that may be brought by or against the trustees or lessees of the road; secondly, that unusual and extraordinary powers and privileges were proposed to be granted as regards the running and operation of the road; and thirdly, that the Legislature would have no power to alter, amend or modify the act. Now sir, I assert without fear of successful contradiction, that no grant or act of incorporation can be found upon the statute books of Kentucky or any other State in which more ample provision is made for the security and protection of the people, not only in the three particulars just named, but in every other respect, than is made in the bill now under consideration; and I challenge any Senator who is opposed to this measure to point out in any charter ever granted in Kentucky a single provision intended to guard and protect the rights of the citizen that is not already in this bill, and pledge myself on behalf of its friends that we will, with the permission of the Senate, immediately insert it. We are unwilling that these misrepresentations, whether willfully or ignorantly made, shall longer circulate without refutation. We are asking for no unusual or exclusive privileges or oppressive legislation. We would not agree to any bill which failed to secure in the most ample manner the rights of all the people to be affected by it. If any body is to be injured or oppressed in person or estate by the operations of the trustees or lessees, it must certainly be the people living and owning property along the line of the road, and not those whose homes and interests are in remote parts of the State. These people are our immediate constituents, and have entrusted their interests for the time being to our guardianship. We are therefore deeply interested in

having full security provided for them, and in all the consultations which preceded the presentation of the bill as well as in those that have occurred since, we have insisted that every limitation and condition under which it was possible for the road to be constructed and operated at all should be inserted for the protection of our own people and the public generally. This has been done, as I shall endeavor to show the Senate by a brief examination of the bill as it now stands.

As before stated, this is not an act of incorporation. There are no words of incorporation in the bill. It is a simple grant to the trustees in their representative capacity of the power to secure the right of way and to construct a railroad in Kentucky subject to certain restrictions, limitations and conditions. The only important part of the grant as respects the right of way, is the provision which enables the trustees to condemn land by legal proceedings and appropriate it to the use of the road upon payment of its value to the owner. As to the restrictions and limitations, it is provided in the first place in the eleventh section of the bill, that a lien shall exist upon the line of railway and its appendages in the hands of the trustees to secure the payment of the principal and interest of the bonds that may be issued in the name of the city of Cincinnati for the ten millions of dollars, but it is expressly declared that such mortgage shall not affect the lien of any vendor for land sold to the trustees, nor be held to include the rolling stock used in operating the road. But the road when completed is to be leased, and the lessees will probably purchase and place upon it additional rolling stock, which will belong to them and not to the trustees. This contingency is also anticipated in the bill, and it is provided in substance that any mortgage that may be made by them on the rolling stock, shall not have precedence over, but shall be at all times inferior in priority to judgments that may be obtained against them by citizens of this State for wages, materials, and supplies in running the road; for damages for breaches of contracts, of affrightment, for injury, loss, or destruction of property put on the cars for transportation, or for any injury to person or property occasioned in the running of the road. There are no such securities provided for the citizen in any act of incorporation in this State as are contained in this section. I do not know what will be the value of the rolling stock necessary in the use and operation of a grand trunk line of railway like this, connecting, as it will, the whole systems of the North and South, and moving the freight of vast regions of country in both sections, but I presume it will be many millions of dollars, perhaps almost, if not quite, as much as the cost of constructing the road itself. This great mass of property is set apart and preserved free from any mortgage or other liens, out of which the people of Kentucky can by ordinary legal process enforce satisfaction of their judgments. Does any Senator know a railroad in the State at the present time owned and operated by a corporation, against which the citizens can, by legal process, enforce the collection of even the smallest sum of money? I know of none, and do not believe there is one in the State. They are all covered over with mortgages and income bonds, pledging the roads with their rolling stock, depot houses and grounds, machine shops, fuel, and even the very tolls and freights which the conductors and other agents receive from passengers and shippers, for the payment of debts due or owing to non-residents of Kentucky; or they are transferred by deeds of trust to non-residents of the State and held as security for the payment of bonded debts held in the East and in Europe. The capitalists abroad who invest their money in the bonds of

these companies at a discount of fifteen or twenty cents on the dollar, with interest payable semi annually, are made perfectly secure, while our own citizens who furnish labor or material, or suffer loss by reason of injuries to person or property, are left without remedy. All this has been done under the authority of legislation, and gentlemen have never raised their voices in protest against it. The representatives of the people along the route of the road proposed to be constructed under this bill, have at no time been willing to confer upon the trustees or lessees authority to create liens upon all their property and thus place it beyond the reach of general creditors. If any better system can be devised to accomplish our object we would be glad to adopt it.

The maximum charge for transportation on the proposed road, is fixed in the bill at thirty-five cents per hundred pounds on heavy articles, and ten cents per cubic foot on articles of measurement for every hundred miles, and four cents a mile for each passenger. This is the very highest rate that they are permitted to charge. It appears to me that the people would have no reasonable cause of complaint upon this subject, even if they should be charged the highest rate allowed for the transportation of freight. A barrel of flour for instance, weighing two hundred pounds, would have to be carried under this regulation one hundred miles for the sum of seventy cents; and this too, when the cars must be stopped and the labor furnished to take on the freight at the point of shipment, and again when it reaches its destination to put it off.

I come now sir, to consider the question of the jurisdiction of our courts over the persons and property of the trustees and lessees of this road, to which so much importance has been attached in some quarters. That it is, owing to the peculiar structure of our system of government a somewhat difficult question to deal with, I readily concede. But I think it can be made tolerably plain, that under the conditions of the bill, neither the trustees or lessees can invoke the jurisdiction of any other tribunal without at once losing all the rights, privileges and immunities conferred upon them by the general assembly of this State. In the first place, in order to facilitate the exercise of the jurisdiction reserved to our courts, and to diminish the expense and trouble of litigation, the trustees who construct the road, and the lessees who operate it, are required to keep an agent in every county through which the road may run, upon whom process may be executed in all actions brought against them. It is then, by the provisions of the fifteenth and sixteenth sections of the bill made an express condition upon which the trustees are authorized to construct and maintain the road, and upon which any person or company may lease it or any part of it, or make any arrangement for operating it, that they thereby waive the right to remove any case from any of the courts of this State to any of the courts of the United States, or to bring a suit in any of the courts of the United States against a citizen of this State; and it is declared that a violation of this condition shall operate as a forfeiture of all the rights, privileges and immunities granted in the act. This forfeiture is to be enforced in any court of competent jurisdiction by an action instituted by direction of the General Assembly in the name of the commonwealth, and it may be for any failure to comply with any of the terms, stipulations or obligations imposed for the benefit and security of the commonwealth or people. If it be at all possible to reserve exclusive jurisdiction in our courts it is certainly done by these promises. They are as strong, explicit and comprehensive as it was possible to frame them. There is no ambiguity about them or any way to avoid

their operation if they are valid. But it has been very earnestly and ably contended that it was not competent for us to limit or take away the jurisdiction of the courts of the United States, and that therefore these provisions were inoperative. That sir, is not the question as I understand it. No friend of this bill has ever been uncandid or thoughtless enough to assert that we can destroy the jurisdiction of the federal courts in any class of cases to which it extends under the Constitution or acts of Congress, or that we can absolutely prevent the trustees or lessees of the road from appealing to that jurisdiction if they see proper to do so. But what we contend for is, that we can in any grant which we may make to them, stipulate that in case they should choose to avail themselves of the right to deprive our courts of jurisdiction, they shall not continue thereafter to exercise certain other rights for which they are dependants alone upon our consent. This position I think, can be sustained by the highest judicial authority, as well as by a process of reasoning based upon the clearest analogies of the law. I recognize the principle that jurisdiction, that is, the power to hear and determine cases, is an attribute of the court, and not a property of the person suing or being sued, or a quality of the thing which constitutes the subject of the litigation. Hence, parties can not by consent or argument, destroy or take away the legal or constitutional power of any court to determine a judicial question properly brought before it. If, therefore, an action were brought in a United States court by the trustees or lessees against a citizen of Kentucky, and the requisite facts existed to give the court jurisdiction under the constitution of the United States and laws of Congress, the citizen could not defend the exercise of that jurisdiction by pleading the provisions of the act of the Kentucky Legislature, however positive and stringent those provisions might be. But it does not follow by any means, that the party who thus resorts to a tribunal abjured, by his solemn compact may not legally terminate or forfeit other rights of a different character secured to him by that compact. The Supreme Court of the United States has repeatedly decided that special acts of a State Legislature conferring rights, privileges and immunities upon individuals or associations of men, whether such acts be in the form of charters of incorporation or grants of property, are contracts within the meaning of the federal constitution, and that they have, therefore, a legal obligation. The legal obligation of a contract consists of the duty of performing it, which is recognized and enforced by the law, or in other words, it consists in its binding force on the party who makes it. There can be no contract without a legal obligation, nor can there be any legal obligation subsisting between parties by their voluntary consent without a contract in the broadest sense of the term. Now it is made an essential and inseparable condition, or stipulation if you please, in this grant, that the beneficiaries, who are the trustees and lessees of the road, expressly insure the right to bring suit in, or transfer suits to the federal courts where our citizens are parties, and they agree and bind themselves that if they should violate this condition or stipulation, their grant shall terminate, and that they will surrender it back into the hands of the State. I say this is an essential condition of the grant, for it enters into the very consideration or moving cause of the contract. Without it the grant would not be made, and for a violation of it the grant must cease. It is in the nature of a limitation upon the duration of the rights and privileges conferred by the Legislature. I hold that it constitutes an important part of the legal obligation of the contract even according to its most

limited and technical meaning, and that the law will enforce it, not by preventing the trustees and lessees from prosecuting actions in the federal tribunals, but by compelling them to surrender the privileges and immunities acquired from the State of Kentucky under this bill. It is a valid and binding contract, unless its consideration be vicious or immoral, or it stipulates for the performance of an act contrary to law or public policy. Certainly sir, none of these prohibited elements enter into this grant. There is a vast difference between a stipulation to perform an illegal act, or to omit the performance of a legal duty, and a stipulation merely to refrain from the assertion of a legal right. The latter is what the trustees and lessees agree to do, and I challenge any one to show to the satisfaction of this Senate, or of any respectable judicial tribunal in the country, that such an argument is in violation of law or contrary to public policy. What law is violated, or what rule of public policy is contravened by these provisions of the bill? Is it contrary to law or to a sound and enlightened public policy for the State of Kentucky in making a grant of great and valuable privileges like these, to provide for the protection of her citizens by her own courts and her own Legislature? As a matter of domestic policy the object sought to be accomplished is a wise and beneficent one, and as no other sovereignty or jurisdiction is impaired, it must be accepted as a legitimate and proper exercise of power. It seems to me that the gentlemen might about as well contend that because the constitution of the United States declares that no law should be passed impairing the obligation of contracts, it would be against public policy for the Legislature to reserve the right to repeal, alter or amend acts of incorporation. But in addition to these considerations, this, as I have already said, one of the conditions upon which the grant is made, and it is required in the bill that it shall be accepted before the grantees enter upon any lands in this State. The act of entering upon lands, or the exercise of any other right conferred, would of itself constitute an acceptance of the grant with all its conditions and limitations, but in order that there may be no question in the matter, a separate and distinct act or declaration is required. If they accept at all, they must take it subject to all the reservations and restrictions enumerated in it. They can not claim the rights conferred and at the same time repudiate the obligations imposed by the bill. They take it with the conditions attached, and they can enjoy it so long only as the conditions are not violated or broken. The rule and the reason are the same as in the case of the devise or conveyance of an estate to a man, to be held and enjoyed so long as he shall not remove to or reside at a particular place. The condition does not operate to prevent him absolutely from removing to or residing at the designated place; that is, it does not deprive him of the power or legal right to do so, but if he exercises the right his interest in the estate instantly ceases. This is a plain and undisputed proposition of law, and it is as applicable to grants made by a legislative body as it is to those made by private individuals. Of course, in either case, if the condition be illegal for any of the reasons I have stated, it will be void.

But, sir, passing from that view of the subject which considers only the right of the courts to ascertain and declare a forfeiture of the privileges proposed to be conferred by this bill, I rely with implicit confidence upon the unquestioned power of the Legislature itself, as expressly reserved in the act of 1856, and substantially reasserted in the sixteenth section of this bill, to repeal the entire grant absolutely whenever there shall be a violation of any of its conditions or an abuse of any of

the powers delegated. This raises the question far above all the technical canons of judicial construction about which lawyers can quibble or judges can hesitate. It lifts it to the broad level of all these great subjects of exclusive legislative cognizance, which affect the general welfare of the people, and confides its determination to the sound judgment and discretion of the people's own chosen representatives. By the provisions of the act of Feb. 14, 1856, all charters and grants, and all other statutes, passed after that time, are subject to amendment or repeal, at the will of the Legislature, and in the sixteenth section of the bill under consideration, after enumerating various conditions and stipulations, and immediately following the condition in relation to the institution and transfer of suits, it is declared that "a violation of such condition shall operate as a forfeiture of all rights acquired under such lease, or arrangement, which forfeiture, and all other provisions of this section, this Commonwealth reserves the right to enforce by all necessary remedies and additional legislation." And then follows the amendment which was proposed in the House of Representatives, and accepted by the friends of the bill, reserving the right to alter, amend or modify the act, and to regulate by general laws the rates of charges for the transportation of freight and passengers over the road. Here, then, is a wide field for the future exercise of legislative power over this whole subject, expressly reserved by existing laws and by the provisions of the bill itself; and over the exercise of this power it will not be pretended that any court, State or Federal, can have any control whatever. Unless, therefore, gentlemen can successfully assail the future Legislatures of the State, upon the ground that they will be wanting in the fidelity and vigilance essential to the discharge of their public duties, they can not complain that ample security is not afforded, or ample remedies reserved. If the trustees or lessees abuse any power actually granted, the Legislature can and I think will, amend the act and diminish that power, or provide additional safeguards. If they wantonly exceed their powers, or violate any material condition of the grant, the Legislature can, and I think will, repeal the act absolutely. I am willing to commit the interests of my immediate constituents in this matter to the care and protection of their representatives who shall come after me as members of the General Assembly. They will be compelled to decide upon the character and extent of legislation necessary for the protection of the people, and they will be responsible directly to the people themselves for any failure to supply that legislation.

Much has been said, from time to time, about the necessity of providing for the appointment of five Kentucky trustees to act in conjunction with the trustees named in the bill, and to watch over and protect the interests of our citizens, and it has been urged that a failure to do so would be placing the people of Kentucky at the mercy of a foreign corporation. Indeed, the preservation of the dignity and honor of the State itself has been supposed by some gentlemen to depend in a great measure upon the incorporation of such a feature in the bill. I submit, sir, that in the provisions of the bill to which I have called the attention of the Senate, we have secured to the people the control, guardianship and protection of a more competent and responsible body of men than would be likely to be procured as Trustees. We have made the members of the General Assembly of the State of Kentucky, chosen by the people of Ken-

tucky, and acting under the responsibilities of their official oaths, the trustees, not of the road, but of the rights and interests of the people as against the road and its owners and managers. What higher security do gentlemen want? Are they willing to commit the interests of the people, and—to repeat their favorite expression—"the dignity and honor of the State," to the keeping of five trustees appointed by the Governor and acting without official responsibility—for it has never been proposed to require them to execute a bond or take an oath—and yet unwilling to repose the same measure of confidence in the wisdom and official integrity of the members of the General Assembly? I prefer to intrust this matter to the higher and more responsible body, and I believe the people, when they understand it, will agree with me. In the hands of the Legislature it is beyond the reach of the Federal tribunals which gentlemen dread so much, and free from the operations of all those unfriendly influences which might be concentrated upon trustees appointed by the Governor.

These, Mr. Speaker, although they would seem to be sufficient, are not all the securities provided in the bill for the benefit of the people. There are others of a different character, intended to insure cheap and equal rates of transportation, and at the same time to protect the interests of other railways in the State. I said at the beginning of my remarks that the lessees of this proposed road could not, if they desired, make any discriminations against the citizens of Kentucky, or so manage the road as to promote the prosperity of one section or city at the expense of another, and in support of this statement I desire now to call the attention of the Senate to some other provisions contained in this sixteenth section. In it they are in positive terms prohibited from making any discrimination against the citizens of this State in carrying freight or passengers, or any unjust discrimination in favor of through freight or passengers against way freight or passengers, or against freight or passengers from other railroads connecting with this road in this State; and they are required to charge and receive only the same, and no more, for the same services in transporting freight or passengers going to or coming from one connecting road, that they charge or receive upon those going to or coming from any other. In this respect again this bill is different from all the railroad acts in Kentucky. No other one contains any such provisions or any equivalent clauses for the protection of travelers and shippers of freight, or for the benefit of connecting roads. They explain themselves, and no comment of mine could make them better understood. Those who live along the lines of the railroads now in operation in this State, will certainly understand them and appreciate their importance. The shippers of way freights, on some of these roads at least, are constantly complaining of the extortions practiced upon them, and appealing for legislative relief. It is certainly wise to provide in advance against these unjust discriminations, and this, we think, has been effectually done in this bill.

This measure has been discussed as if it were a contest between the cities of Cincinnati and Louisville, and we have been urged not to authorize the construction of this road because it would give an undue advantage to a city in another State over one in our own. Sir, I do not so regard it. I do not advocate the passage of this bill as a Cincinnati or northern measure, but as a Kentucky and southern measure. I entertain no feeling of

hostility to the city of Louisville, and would not purposely do anything calculated to diminish her power or prosperity. On the contrary, I sincerely trust that her growth and progress may be as steady and as enduring as the flow of the great river that runs by her side. Let her continue to extend her trade and enrich her people by fair competition, upon an equal footing, with other localities and communities, and no voice will ever be raised against her among the friends of this measure. I do not believe that the construction of this road will be in any respect prejudicial to the city of Louisville, but that it will, on the contrary, be highly beneficial to all classes of her population. It will give them a new and independent line of communication with the South, striking the southern system of railroads at its most important point, a point from which lines of railway radiate in almost every direction. This road, if constructed upon anything like an air-line, will intersect and cross the Knoxville branch of the Louisville & Nashville road somewhere between Lebanon and Stanford. It must necessarily cross that branch road at a point considerably nearer to the city of Louisville than to the city of Cincinnati, thus securing to Louisville a shorter line to Chattanooga than Cincinnati will have. Will some gentleman tell me how this arrangement of the means of transportation can injure the merchants and manufacturers of Louisville? By the provisions of the bill to which I have just called the attention of the Senate, the lessees and managers of the proposed road can make no discrimination in carrying freight or passengers to or from this Knoxville branch. They are bound to receive and carry all freights and passengers, no matter where they come from or to what point they may be going, and they must carry them to and from this branch road at the same rates charged for carrying to and from other connecting roads. When, therefore, the merchant or other purchaser from the South reaches the junction of these roads, he has his choice between the markets of Cincinnati and Louisville, with the advantage in favor of Louisville on account of the fact that it is reached by a shorter route. These are facts which no gentleman can deny, and yet the opponents of the measure have never ceased to assert that the passage of the bill would work great injury to Louisville by giving to Cincinnati superior facilities for transportation. This, then, is not a contest between the cities of Cincinnati and Louisville, but it is simply, in one of its aspects, a question whether or not a single railroad company shall continue to enjoy an absolute monopoly of the carrying trade of the South through Kentucky. It is a question whether or not any competing road shall ever be constructed for the benefit of the people. This question we must decide to-day, and then it will remain only for those who are interested in the subject to approve of or condemn our action.

I have now, Mr. Speaker, presented and endeavored to explain and vindicate the most important provisions of this bill so far as they affect the interests of Kentucky and her people. There are other provisions in relation to the taxation of the road by the State, and the duration of the grant, which is not necessary to recite or dwell upon. If I have mis-stated any of its provisions, or drawn any erroneous conclusions of law or of fact, there are gentlemen here entirely competent to correct my mistakes and refute my arguments. As my main purpose in addressing the Senate this morning was to explain the bill, and to answer, to the best of my ability, the various objections that have been urged against it, I ought, perhaps, to conclude my remarks at this point. But there are one or two other considerations, of minor importance to us, not arising directly from the provisions of this bill, but somewhat

connected with it, which have been frequently alluded to by its opponents, and which may as well be briefly noticed. It has been said that the Ohio act under which these trustees were appointed is unconstitutional. If this were true, sir it would be wholly immaterial to us and to the people of Kentucky. It is a question affecting alone the interests of the taxpayers of Cincinnati, and the holders of the bonds that may be issued. Those who invest their money in the bonds might lose their investments if the act under which they were issued should ever be declared unconstitutional, but the people of Kentucky would still have the road. That could not possibly be taken away from us. We are not asked to purchase a single bond, or subscribe a dollar of stock to this enterprise. The road is to be constructed exclusively at the cost of the city of Cincinnati, and the validity of the act under which she expends her money is a question for Ohio lawyers and Ohio courts to determine. They determined it in favor of the constitutionality of the act upon every occasion when the question has been presented. The members of the Legislature, acting under the responsibilities of an oath to support the constitution of that State, passed the act almost unanimously, and the Superior Court of Cincinnati, in the proceedings for the appointment of trustees under the act necessarily appointed its validity. The same Court in general term in an action instituted by tax payers for the express purpose of testing its constitutionality, unanimously decided that it was a constitutional and valid law. In that case the Court after elaborate argument and citation of authority, concludes its judgment in these words:

"Upon the whole case, we hold that the 'act relating to cities of the first-class, having a population exceeding 150,000 inhabitants,' passed May 4, 1869, and the act of March 25, 1870, supplementary thereto, both of which are recited in the petition, are constitutional and valid; in which opinion we are unanimous."

But, sir, if gentlemen are not satisfied with these legislative and judicial declarations in support of this particular act, I would remind them of the fact, that in the Supreme Court of Ohio, the tribunal of last resort in that State, passed upon and construed the provision of the constitution relied upon before the "Ferguson Bill" was ever dreamed of. The question arose upon an application for a writ of mandamus which went up from the County of Warren. In the year 1867, the Legislature of Ohio passed an act authorizing County Commissioners to lay out, construct and improve roads on petition of a majority of the land owners along and adjacent to the lines of the roads. The Commissioners of Warren County, after a petition had been presented as required by the act refused to confess the report of an engineer who had been appointed to let out the work upon contract, and refused to take any other step in the matter upon the sole ground, that the act was unconstitutional. I will not occupy the time of the Senate by reading from the report of the case further than is necessary to show precisely what question was presented and how the Court decided it. (Mr. Carlisle here read from the case as reported in 17 Ohio State Reports, 558, to show that the Commissioners had based their refusal solely upon the ground that the act was unconstitutional, and that the Court recognized that as the only question presented). It will be seen from what I have read that the sixth section of the eighth article of the Ohio Constitution, which declares that the General Assembly shall never authorize any county, city, town or township, by vote of its citizens or otherwise, to become a stockholder in any joint stock company, corporation or association whatever, or to raise money for, or loan its credit to, or in aid of any such company, corporation or association,

was expressly relied upon by the Commissioners to justify their refusal to act, and the opinion of the Court shows that their position was not sustained. A peremptory mandamus was awarded. I am not undertaking to make an argument upon this question, but merely to state what has been the action of the Ohio authorities. Its discussion involves very important and difficult questions concerning the nature and extent of the power of taxation, which would doubtless be quite interesting to the members of the legal profession, but tedious and unprofitable upon an occasion like this; for, as I have said before, we can not possibly be injured by its decision one way or the other. It affects the people of Ohio alone and the Courts of Ohio are the forums in which it should be tried.

Mr. Speaker, if we listened only to those gentlemen who oppose this Bill, we would be led to conclude that the proposed road began in Cincinnati, extended towards Cincinnati and terminated at Cincinnati. They appear to forget that it will traverse the State of Kentucky for a distance of two hundred miles through its richest agricultural and mineral regions—and that it will open to the markets of the North and South vast sections of country now wholly inaccessible except by the most primitive modes of conveyance. They appear to forget that it will add immediately and directly ten millions of dollars to the taxable wealth of the State in a species of property as permanent and immovable as the soil upon which we tread. How much more it will add by the increase of production and trade, by stimulating enterprise, by arousing the energies of our people and enhancing the value of lands along the route, no man can certainly tell—he can only approximate it by a comparison of the results which have followed the construction of similar works of internal improvement elsewhere. It has been said that thirty millions of dollars is a low estimate of the amount which will be directly and indirectly added to the value of our taxable property.

I do not know how this may be, for I confess myself unable to make a cold calculation of the dollars and cents which this particular enterprise promises to bring to the people or to the treasury of the State. My attention is fixed and my interest is centered upon the obvious necessity of the general system which the construction of this road will inaugurate, and which must ultimately lead to the full development of all the great resources of the State. This will be the grand trunk from which branches will project to every material point in the State. New lands will be brought into cultivation, thriving cities, towns and villages will spring up, mines of lead, coal and iron will be opened, the almost inexhaustible products of our forests will be made available, and the old commonwealth which now lingers in the rear of her sisters, doubting, hesitating, and reluctant to take a new departure, will present such a scene of activity and prosperity as few of her sons have ever dreamed of, and will become in the course of time as celebrated for her wealth and power as she is now for the courage and hospitality of her people. It will contribute as much to the cause of education, in the promotion and dissemination of general intelligence among the people, as any common school law that we have ever enacted; for all experience teaches that if the people are afforded the means of cheap and rapid communication of their material products and of their thoughts and opinions, they will educate themselves in all the useful and practical branches of knowledge. Actual contact with the world, and actual experience in its affairs, are worth to the great mass of the people more than the learning of schools and colleges. I do not understand the value of institutions of learning, but I hold it to be our duty to furnish every

auxiliary means of education within our power. We must open up the avenues of trade and commerce, and let into Kentucky the streams of practical knowledge which now flow around her. Then she will prosper and grow; her citizens will be contented; her laws will be obeyed, and she will stand among the States of the Union a striking example of the happy changes that can be wrought by wise legislation.

But, sir, if we are determined upon a policy which will forever lock up her vast resources, obstruct the channels of communication, and stifle the energies of her people, we must prepare ourselves for a subordinate and dependent position in this great confederacy of States, and we must expect that position to become more and more dependent and humiliating year by year. We must move forward or we must go backward. Position is one great law of the universe. Stagnation is death to political communities as well as to natural bodies, and it is for us to say now whether we will be borne on with the current which carries our neighbors and friends, or float idly awhile upon its margin, to sink at last beneath the weight of our prejudices and folly. The bare contemplation of such a fate, even as a contingency of the distant future, should arouse us at once to the most vigorous efforts to avert it. And when it is remembered, sir, that we are to drag down with us our natural friends and allies of the South, who are now struggling as heroically for a triumph over her misfortunes of the late war as they struggled during its continuance for the success of their arms, we are assuming a degree of responsibility which should warn us to pause and consider before we strike the fatal blow. This proposed road will penetrate to the very heart of the Southern system, and connect with lines leading to the commercial centers upon the Mississippi and upon the gulf and sea. Tennessee, Georgia, Alabama and South Carolina, four States bound to us by many ties of friendship and interest, are appealing for access to the markets of the North and East, but Kentucky stands like an armed enemy between them and the communities which they desire to reach, and warns them off of her territory. She proclaims to them that her soil is too sacred and her dignity and honor too precious to be polluted by their commerce.

This idea of State rights is too finely drawn for my comprehension. It is not the plain, sturdy, old-fashioned doctrine of our fathers, but a mere apparition, invoked for the occasion by the incantations of gentlemen in search of a substitute for an argument. If the sovereignty of this stanch old commonwealth can be overthrown by the influence of a few peaceable and quiet gentlemen with a railroad, it must certainly stand upon a more precarious foundation than we have generally supposed.

But, sir, I have detained the Senate longer than I intended, and will not trespass longer upon its time. I ask no Senator to vote for this measure against his honest convictions of duty; but I do ask all to give it a thorough and impartial consideration before voting against it. No Senator can say that his constituents are not interested in a measure which will increase the wealth of the people and the revenue of the State by developing the hidden treasures of our mountains, multiplying the products of our valleys and plains, and awakening a new spirit of activity and progress among our citizens. I thank the Senate for the patience and attention with which it has listened to my remarks.

The North Georgia coal region is estimated to extend through an area of 240 square miles, and expected to yield 1,300,000,000 tons.

The Railroad Record.

E. D. MANSFIELD, - - - - - }
T. WRIGHTSON, - - - - - } Editors.
A. J. HODDER, - - - - - }

CINCINNATI, - THURSDAY, MARCH 16, 1871

The Railroad Record,

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The Pennsylvania Railroad and the Tunnel Route.

The action of Congress requiring the bridge company to raise the bridge 25 feet higher, has raised a new question with the railroad company, with the bridge company, and in fact with the interests of Cincinnati, and with the public. It is the interest of all parties that the bridge should be built; and that the railroad company should have all reasonable facilities in entering the city, and in transacting their business. No doubt the city will be willing to do all to accomplish these objects which can be reasonably expected. The new question which rises is—if the bridge be put 25 feet higher in the air, how are the cars to get on or off?—for to grade on to a bridge 25 feet higher will require some distance to do it in. Supposing the grade was 75 feet to a mile, the additional distance required for the grade will be one-third of a mile, we may safely say half a mile in addition. On this state of fact, it is very plain that the present Miami depot can not be used for that purpose. Where then shall the road find depot grounds? And how grade up to them? This is a question which was not raised in the bridge discussion; but which to the company was the important one. We understand that this question is now under consideration by the Pennsylvania company; and since that company is the lessee of the Miami road, and the largest stockholder of the bridge, it may be

considered the party in interest, and the only one to decide upon this question. Governed, no doubt, by the same motives which govern other companies in business, we do not expect it to decide upon any other grounds than what it believes to be its real interest. Hence we here leave to make some suggestions as to what that interest is.

1. We will remark, that in providing for the future all the great railroad companies of the country have fallen far short of a just estimate of what they really needed in the way of depots and accommodations. Take the very two companies involved in this case. The highest estimate made by engineers of the amount of business to be done by the Little Miami Railroad did not amount to *one-fourth of what it actually does*. It is the same with regard to depot grounds and tracks, the company have bought four times as much as they had originally. Even the Pennsylvania Railroad Company had not in the beginning any comprehension of the business they have done, or the accommodations they would require. The same is true of the Cincinnati, Hamilton & Dayton road. It has been compelled to buy new grounds and make new tracks, and now has not half enough. We say this, because, in endeavoring to avoid a present expense, the Pennsylvania company may make a mistake, by not providing fully for the future. Hence it is the part of wisdom to consider thoroughly any plans which may be presented for the solution of what certainly seems a difficult problem.

2. We therefore suggest that in the present look of affairs, the tunnel route is what the company ought to take. Let us examine it. The thing needed by the Pennsylvania company is depot grounds to which they can grade. They can not do it to their present depot. Where can they get them? West of Deer creek it is literally impossible without expending millions of dollars. East of Deer creek it is only possible by grading round their present track very high up, buying very valuable ground as a right of way, and finally buying new grounds at immense expense. This is the only course left if it be determined to come on to the bridge by their present track through the city. How much all this will cost we do not know; but we are quite sure it will be a great sum. For it must be observed that to do the business the company justly expects to do will require a large amount of ground, and the approaches to it of easy grade.

But this is not all. Conceding the possibility of making a short curve from the bridge and getting a track through the water works ground to a depot above, conceding this, it is liable to serious objection. It is a dangerous working machine to be elevated high above streets and buildings, and grading through a mile of houses. It is not only dangerous, but difficult in working. Such a plan will un-

doubtedly cost a great deal, and be difficult of performance. We will suppose then that grading up Eggleston avenue, the company gets new depot grounds above. As a depot this might do well; but how are the cars to pass from the bridge to the Miami road? Clearly by grading round in the east side of Deer Creek, and then returning from the depot to the bridge. This is obviously not materially different from the other plan in its difficulties. It will cost a great deal to grade to the depot on the east side of Deer Creek; and it will be an indirect and dangerous way. What then remains? The simplest and best of all the plans. Finish the tunnel, and go direct from the bridge to the tunnel directly on through Sharon. We do not know, but from what we hear, should think the tunnel could be finished and depot grounds obtained for no more than the routes we have here already described can be got. If this be so, then the tunnel route is clearly the best. What is the objection?

3. Here we come to the observation we made at the commencement of this article, that the great railroad companies have in almost all instances, underrated and mistaken their true interests in providing for the future. It may be so now. What is the objection to the Pennsylvania Company making the tunnel? It is said the adoption of the tunnel involves the making of a new road, or branch 20 miles. Well, for the sake of the argument we will call it 30 miles. For the true plan would be to continue the Wilmington road through the tunnel. Well, what would it cost, tunnel, depot and all? We say, with a pretty good knowledge of what railroading is, that the whole need not cost over \$1,800,000. Well, how much less than that will buy the right of way, depots and houses through the city? We will suppose that this could be done for \$800,000; and these \$1,000,000 extra be required to carry it to the Wilmington road, or a branch through the tunnel; would not that be repaying the company ten-fold? Let us see: 1, Depot grounds on the upper plain of the city would be out of comparison the best in the city for the *distribution* of persons and freights; 2, From this depot to Loveland, or any similar point on the Miami, will be *two miles shorter* than the present line, and *three miles shorter* than the Marietta line, and 3, this new line will be absolutely needed by the Pennsylvania Company. Why? Because of the very measures the company has already taken in securing its south-western connections. What is the bridge built for? Why obviously to make a continuous connection through Cincinnati with Louisville, Nashville, and especially Memphis. Now if such connection be made, the main route for the immense growing trade of the South-west will be through Cincinnati and over the Cincinnati route. Even if the "Southern road" be made it will con-

tribute directly to the same end. What will be the consequence? An immense increase of business over the Southern road. How is it to be done? We undertake to say that it can not be done by any present arrangements the company are making. No provision has been made for four tracks, and yet four tracks will be absolutely necessary. Thus, a clear sighted policy for the future will make a new road through the tunnel, which can probably be done for half what it will cost in a few years. Let the tunnel be made and the saying of the late John Kilgour be fulfilled, that when the tunnel was made, the cars of the Little Miami Railroad would be the first to run through.

A Good Thing.

Mr. George P. Cubler introduced to our business men a novel and most valuable system of advertising.

He publishes as a center of a 12x25 sheet in good type and upon excellent paper a condensed Railroad Tariff South, which is very desirable if not actually necessary to every shipper of goods to any point in that section of the country. Around this center are placed the cards of some of our leading business houses, the whole making a neat, compact and valuable office reference.

Altogether, this is to our mind the best advertising plan that has come under our observation, and from its ready endorsement by the leading business men of our city, we infer they agree with us.

Cotton grown from Alabama seed in Merced county, California, this year, compares favorably with Brazilian and Egyptian cottons, and is superior to the best Southern Uplands for spinning purposes. The effect of the dry equable climate of California is an improvement in the staple yielded from the same seed as planted upon Southern uplands. There are large sections of the State well adapted to cotton culture, and there is no good reason why, at some future time, this interest should not become an important one on the Pacific slope.

Some interesting calculations have been made in regard to the quantity of gold in circulation at different periods of the world. The estimation is that there was at the beginning of the Christian era, \$425,000,000; at the time of the discovery of America, \$57,000,000; in 1600, \$105,000,000; in 1700, \$350,000,000; in 1800, \$1,123,000,000; in 1843, 2,000,000,000; in 1853, \$3,000,000,000; in 1870, \$6,000,000,000. The whole of the last mentioned sum melted down, could be contained in a cube measuring twenty-six feet on the side.

Over 5,000,000 packs of cards are made in this country annually, and these vary in price from the common steamboat, star or calico back, at \$18 a gross, up to the Great Mogul cotton plant backs, at \$150. Massachusetts buys more of the high priced cards than any other State.

By the laws of Iowa no quails can be shot before 1875.

THE SHERMAN BILL.

Speech of Hon. Thomas Wrightson in the Kentucky Senate on the Resolutions Instructing our Representatives in Congress to Oppose it.

A Republican View of the Powers of Congress and the Rights of Cincinnati.

Pending the resolutions adopted by the Kentucky Legislature with reference to the power of Congress to endow the Cincinnati trustees with franchises which Kentucky had refused. Senator Wrightson (Rep.) of Campbell, spoke as follows:

MR. SPEAKER—The resolution now before the Senate is one that should receive our most serious consideration, and not be lightly or flippantly disposed of. There are several very grave questions involved in it; and, although I do not anticipate the majority of this body will concur in the views I shall present, yet, sir, I deem it my duty to this Senate, to my constituency, and to the great Commonwealth of Kentucky, that I should on this occasion endeavor, although in a feeble manner, to prevent our putting the State of Kentucky on the record upon the wrong side of a great national and political question, and that, too, in the light of history, in the face of precedent, and contrary to fact.

To more properly understand this question, it would be well first to review the history that Kentucky statesmen have recorded on this question, that is, of the right of Congress to do, or to aid in doing, certain things within the boundaries of the States; second, whether the work proposed to be constructed by the bill pending before Congress, and which we are asked to condemn, is of the character of those advocated by the distinguished gentlemen who have preceded us in these halls; third, whether this right or power is conferred on the Congress of the United States by the Constitution; and fourth, whether they have ever exercised it and been sustained in so doing by the Supreme Court of the United States.

I trust the Senate will bear patiently with me and accept that apology which is so essential under the circumstances, it being well known to you all that I am not a lawyer. It is therefore with great diffidence that I undertake to discuss in the presence of some of the best legal talent of the State the grave questions of constitutional law.

We will, at the outset, inquire what is proposed to be done by the Congress of the United States that we are now asked by the resolution under consideration to censure and condemn, and to exercise that delicate right to instruct our Senators and request our Representatives to oppose.

It is, sir, a measure introduced by Senator Sherman, of Ohio, entitled "A bill to promote the construction of the Cincinnati Southern Railway."

This, you are aware, is not a new measure. It is one that has occupied the thoughts and engrossed the ablest talent of many of the best and leading minds of this and other States for the past thirty-six years. It is a work, sir, not merely local in its character, but of national importance—not confined in its effects and influences to the State of Kentucky, but, sir, it affects the interests of other States both North and South of us. In 1835, Gov. J. T. Moorehead in his message thus alludes to it:

"Another scheme no less imposing, and presenting considerations of even greater magnitude to Kentucky is now proposed, to unite the Ohio river with the Atlantic ocean, by a railroad of seven hundred miles in extent, terminating at the city of Charleston, in South Carolina; and from the manifestation of public favor with which it has been received, flattering assurances are deduced of the earnest and decided concurrence of the States through which it will pass in its immediate construction. * * * * *

A moment's reflection can not fail to satisfy the most inattentive observer of the vast and abiding stake which the citizens of Kentucky, of the whole West and South, and of the nation at large, have in the completion of those interesting projects. Viewed as channels of commerce and intercommunication between the States, the most sanguine calculations must fall short of the reality in estimating the amount of pecuniary interest involved in them; viewed in connection with the future grandeur of our State, they challenge our hearty co-operation; and when we regard their influence on the permanence of our institutions, on the safety and repose, and the perpetuity of the Union, we feel ourselves by one spontaneous impulse discarding names and distinctions derived from local or geographical positions, surmounting every consideration of pecuniary benefit, and preparing to take part in their accomplishment with the ardor and patriotism of American citizens.

The policy of uniting the various parts of our widely extended confederacy by ties of social and commercial intercourse indissoluble as the elements of which they consist, is manifestly important to all the purposes of international wealth and prosperity; but its importance becomes at once conspicuous and inestimable from its connection with the higher object of preserving the integrity of its parts. Of all the calamities which threaten or can befall our country, it is a conceded point that national dismemberment is the most dreadful in anticipation, as it would be unquestionably, the most fatal in its effects. While the means of averting it are under our control, not to avail ourselves of them would be to prove that we are faithless to the highest and most sacred of political obligations, to the memory of our ancestors, to the interests of posterity, and to the great cause of human liberty throughout the earth."

Such an appeal as that from the Governor of Kentucky, patriotic, statesman-like and replete with sound wisdom, was well calculated to produce a result in the minds of the legislators of the day. It did. It was very like the effect produced on this Legislature and the people of the State when it was announced that Cincinnati would knock at our doors and ask permission to spend her millions to construct this very "channel of commerce and of intercommunication between the States;" nearly all sections of the State alike wanted it, and desired the advantages that its construction would create. The final fate of this measure, so recently before us, and the one to which Governor Moorehead in his message of December 28, 1835, referred, was remarkably similar. It was impossible for the road presented for the consideration of the present Legislature, to go to every county seat or pass by every man's door, (otherwise it would undoubtedly have been a law to-day,) and the bill of 1835 was killed by the effort to force the projectors of the road to construct three lines through Kentucky instead of one. There is, sir, another remarkable coincidence in the parallel; that is, the bitter opposition

to the measure of the present session came from the two points which the two divergent branch roads which, by the bill of 1835, were forced to be simultaneously constructed, and which loaded it down and killed it—Louisville and Maysville. Thus much for the history of this enterprise.

Allow me now to attract your attention briefly, to the views expressed by Kentucky statesmen in relation to the right or power of Congress to construct works of internal improvement in and through the States. Governor Metcalfe in his message to the Legislature dated December 7, 1830, says: "I shall not attempt here to discuss the constitutional power of Congress to make or construct public roads. It would surely be a useless labor. The State of Kentucky, by legislation in all its solemn forms, and by resolutions equally solemn, has asserted and reasserted that power, and declared that principle with almost entire unanimity."

"The Congress of the United States by many acts has claimed the power and carried it into practice with the sanction and recorded votes of the President, [the President here alluded to was General Jackson,] he then being a member of that body. With you, then, the question is no longer an open one. It rests securely upon authority."

Further on in the same message, Gov. Metcalfe remarks:

"Thus encouraged, the last Legislature again took up the subject, and as a manifestation of the deep interest so generally felt in favor of a speedy construction of that part of the road embraced by the act of incorporation, authorized a subscription of stock on the part of the State, and on the part of individuals, to aid the General Government in the performance of a work, every part of which ought to have been made, as is the practice in other cases, entirely at the expense of the latter."

Again:

"In the veto message, I think I see much to deplore. In it I clearly see the prostration of one of the best and most beneficent principles of the constitution—the loosening of one of the strongest ligaments of our Union—the paralysis of that strong hand which alone is able to accomplish the great and noble end of keeping this wide-spread and growing nation one and indivisible, by the associating and fraternizing powers and influences of internal improvements."

"This is said in reference to turnpike roads, for railroads were scarcely thought of when this was uttered. If true, how much stronger is it, when applied, as by Moorehead, almost prophetically, to railroads—those bands of iron, with hooks of steel—linking together "our widely extended confederacy by ties of social and commercial intercourse indissoluble as the elements of which they consist."

On January 1st, 1828, Robert Wickliffe, chairman of the Committee on Internal Improvements, made a most exhaustive report on this subject, which was adopted by the Senate of Kentucky, together with a series of resolutions as offered by Mr. Beatty. Indeed, sir, Mr. Wickliffe takes the bold and broad ground in the report referred to that the union would be a curse to Kentucky if this power did not exist in the General Government, to open roads or avenues for commerce.

The report says:

"If the new-fangled construction contended for prevail, to-wit: that to facilitate and secure, free from such vexation, the intercourse between the States, that Congress has no power to open a communication, either by land or water, between the States, then indeed may we not only consider the grant of the power to regulate commerce a dead letter, but we may

look for all the evils which that grant was intended to check, by monopolizers engrossing the navigable waters of many of the States, and some of the States tariffing others, by closing upon them their navigable streams, or by shutting them out from an intercourse by closing their highways and only opening them for premiums or duties. That the General Government possesses the power, should ever be maintained by Kentucky; otherwise, indeed, the Union may prove to her a curse rather than a blessing. Dissolve the Union, and the State of Kentucky might, as a sovereign State, buy or conquer for her citizens an outlet for their merchandise to other States or nations."

The report further says:

"It is not difficult to perceive what will then be our condition as an interior State, in our exchanges with the citizens of Alabama and Mississippi, with Tennessee between us and those States. With the people of Tennessee we can never have much commerce. We raise few articles of which she is a buyer, but we raise many of which Alabama and Mississippi are; and they raise articles indispensable to us; but we can not reach these States unless Tennessee gives us a road to pass on. Tennessee has no interest in facilitating our exchange, unless we pay her transit or warehouse duties, and we become sellers to her citizens of our products, and buyers from them of those of Alabama and Mississippi. May she not then avail herself of her position to obstruct the intercourse between our citizens and those of Alabama and Mississippi? And whether we look to the Carolinas or Georgia, we have either Tennessee or Virginia between us and the consumers of our products. Nor ought we to overlook the fact, that at no distant day a free communication to the great Northern lakes may be of vast importance to our country. In fact, whether we look to the South, North, East or West, we are everywhere dependent upon the National Government for a free intercourse and exchange of our labor with other States and foreign nations. Situated as we are, we repeat again, it is of vital importance to us and our posterity that we maintain the power in Congress to open such national highways as may be essential to carry into complete effect the powers to regulate commerce between the States."

Let me ask, sir, is it not singular that to-day we are asked by the resolutions from the other house to promulgate a doctrine that in other times was regarded as "new-fangled," and as fatal to all the cherished interests of Kentucky? Times must have changed, indeed, and become "sadly out of joint," if, in the days of the Wickliffes, and Mooreheads, and Metalfes, it was not only constitutional and right, but "vital importance to us and our posterity, that we maintain the power in Congress to open such national highways as may be essential to carry into complete effect the powers to regulate commerce between the States." Can great constitutional principles change like a weathercock, with every wind that blows? Or is it because some other ox than ours is gored? These, sir, as I stated in the outset, are grave questions, and can not be answered here, as at the hustings, with a joke or a jeer, but they challenge the discretion and wisdom, not of interested partisans, but of statesmen. I trust, sir, they will receive that consideration which their importance demands.

Mr. Wickliffe defines in a very specific manner, the character of the improvements that it was deemed Congress had the power to make. The report further says:

"The river must pass through two or more States, as the Mississippi does, so as to make an interference with it on the part of Congress, under the power to regulate commerce between

the States, constitutional. The same may be said of the canal around the falls of the Ohio, or the canal to connect the Chesapeake and Delaware waters. To justify the nation in opening a road, it must either be necessary to regulate commerce between the States, or to pass the national mails on, or the national troops and munitions of war, or all of them.

"We do not advocate the power of Congress to make roads, or meddle with the waters of any State; where such interference is not obviously necessary to effect some one or more of the powers conferred on Congress—confining the power thus to its true constitutional limits—the States will have ample powers left them over their soil, to make State roads and canals for all State and sectional purposes, while for all national ends and purposes the national energies can and will be exerted for the general good."

It should be remembered that it was roads—national roads—not rivers, that Mr. W. is arguing about. "The river must pass through two or more States, as the Mississippi does, so as to make an interference with it on the part of Congress, under the power to regulate commerce between the States, constitutional." If, instead of the "river," you would just say the "road" must pass, etc., and you have the exact position assumed by Kentucky forty years ago, and the present case involved.

The report concludes by the following:

"The savings to the nation in the passing of the mail, the celerity and security with which it would pass, offer to both the government and the people incalculable benefits. Between Kentucky, Tennessee, Alabama and Mississippi, it opens a communication of the greatest importance to each State, and highly calculated to increase and reward the industry of all, by a convenient and mutual exchange of the products of labor. To our own State it offers peculiar local benefits. Taking its rise on the shores of the Ohio river, it then must pass through the most populous and flourishing part of the State, crossing in its course many navigable streams, at points from whence they are navigable to the Ohio. Your committee, therefore, recommend that application be made by the Legislature, to the Congress of the United States, to obtain the passage of an act of Congress, providing for the establishing and constructing said road."

The resolutions are not less explicit. The second and third of the series read as follows:

"2. Resolved, That it is the deliberate opinion of both branches of the Legislature, that the Government of the United States constitutionally possess the power to make and construct canals and roads within the United States and territories belonging to and under the Government of the United States, for the purpose of furthering the military operations of the Government and the transportation of the mail; and that said Government has the right to judge and decide when those objects call for and demand such improvements."

"3. Resolved by the members aforesaid, That we most cordially approve of the policy of the present Administration in its efforts to extend the great National road from Wheeling to Columbus, in the State of Ohio; thence to Indianapolis, in the State of Indiana; thence to Vandalia, in the State of Illinois; thence to St. Louis in the State of Missouri; and we equally approve the policy in extending a branch of said road by Chillicothe, in the State of Ohio; thence to Maysville and Lexington, in the State of Kentucky; thence to Nashville, in the State of Tennessee, and thence to New Orleans."

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has decided this matter in a manner, sir, that it seems to me ought to satisfy the mind of every gentleman on this floor. The case is a

very celebrated one. It is that of Dickey vs. The Maysville & Lexington Turnpike Road Company, wherein M. W. Dickey, by virtue of being a mail contractor, claimed the right to pass over the road without paying the customary tolls. Chief Justice Robertson delivered the opinion of the court. The Chief Justice very properly held that Dickey had the right to use the road "only as others have a right to use it," and that he should be "compelled to pay the prescribed toll." But, in reference to the power of the General Government to "establish post roads," Justice Robertson says:

"And hence the interest being thus common, and the power, therefore, national, the burden and responsibility also should be, and undoubtedly is, equally national in each and every State. The right to judge and the responsibility of judging as to what roads and kind of roads the United States shall have for post roads having been devolved on Congress, a State can neither exercise any controlling authority in that respect, nor be held responsible for any deficiency in any of its facilities necessary or proper for the most effectual transportation of the mails."

"The national power to use the land of a citizen or a State for an armory or a fortification is undoubted and irresistible. The constitutional obligation to pay the owner a just equivalent, if it be demanded, is equally undoubted and inevitable. Yet, nevertheless, there is no conflict of power or right, and the supremacy of the general government is unquestioned and unimpaired." * * * "And so far the two powers over post offices and post roads are identical; but the latter is, in other important respects, more comprehensive and efficient than the former; for we are clearly of the opinion that both the objects contemplated by the grant of the new power to establish post roads, and the plain constructive import of the grant itself, as made in the Constitution, show that this comprehensive and express power was given, not for authorizing the mere designation and use of State roads as post roads, but for enabling the general government to make, repair and keep open such roads in every State as might, under any circumstances, be necessary for the most effectual and satisfactory fulfillment of the great national trust of transporting the national mails safely, certainly, speedily and punctually, without any necessary dependence on the policy, or will, or purse of any one of the States; and these were, in our opinion, the only ends for which that express power was given."

Again—

"Whether we consider the popular use of the word 'establish,' or the definition of it by the most approved lexicographers, or the admitted import of it in the preamble and in the fourth clause of the eighth section of the Federal Constitution, it must be understood to mean, not merely to designate, but to create, erect, build, prepare, fix permanently. Thus, to establish a character, to establish oneself in business, to establish a school, or manufactory, or government—all common and appropriate phrases—are not to assume or adopt some pre-existing character, or business, or school, or manufactory, or government. To establish in each of those uses of the phrase, clearly expresses the idea of creating, preparing, founding, or building up." * * * "Just so, also, is it used and understood in the Federal Constitution."

"These questions are, we think, too plain for grave debate or serious doubt. But, if Congress can thus reconstruct or repair a road for a post road, its power to make one *de novo* can not be consistently doubted. Then it must, as we think, be admitted that there may be cases in which Congress has the constitutional authority to repair, reconstruct, and even make, roads for post roads. But if the power exists in any case, it must exist in every case in

which a post road is necessary or is established."

"And under the plenary power to establish post roads, Congress must, therefore, have as much right to make and repair roads as the States ever had, for the purpose of having suitable post roads. The consent of a State is not indispensable; for, if the Constitution gives the power, it exists without the concurrence of any State; and if the Constitution did not delegate the power to Congress, the consent of a State, or of all the States, could not give it, without an amendment of that National charter, from which alone Congress derives or can derive legislative authority." * * *

"The Constitution only designates certain general ends, and expressly confers only certain comprehensive powers. Subsidiary powers are implied, and could not have been enumerated. All powers necessary and proper for executing the enumerated powers, or for fulfilling the duties imposed by the Constitution, are implied, and exist as certainly as if they had been expressly given—excepting so far only as they shall have been prohibited."

"As the general, and not any State government is responsible for the faithful and satisfactory execution of this important trust, and must of course possess, not only the exclusive right to decide as to the best modes of fulfilling it, but supreme power to provide and enforce the requisite means for attaining the general end, it must have the authority to judge whether the roads in any State are suitable or sufficient for proper post roads; and if, in its judgment, there be, anywhere, any deficiency of road facilities, it must have the implied power to supply the deficiency, either by construction, reconstruction, or reparation, as it shall consider most expedient."

"A State can not claim the right to decide whether she has all the roads which the general government needs for transporting the mails, nor whether all her roads are in a suitable condition for post roads."

"But the power, in each class of cases, to execute the national trust, independently of State provision or State consent, is equally unquestionable; and, in case of post roads, the occasional exercise of that power would doubtless be not only just but greatly advantageous. Where there shall not be, in every respect, a suitable post road, it is, in our opinion, the duty of the general government to employ all the means which shall be necessary and proper for securing such a road as the public interest demands."

It is very clear, then, sir, from the position assumed by the then and now venerable Chief Justice, of our own State, what is the power of the general government in the premises; indeed, it is not only a power but the duty, according to Justice Robertson, of the general government to construct such post roads, and that the general government is to be the only judge of when they are necessary and proper, and that, too, "independently of State provision or State consent."

But the Chief Justice very properly remarks, and as necessary to the protection of the rights of States and of citizens, "that, unless Congress shall elect to exert its right of eminent domain, and buy a State road, or make one, or help to make or repair it, the Constitution gives no authority to use it as a post road without the consent of the State or owner, or without making just compensation for the use."

I have already absorbed too much time in furnishing the proofs that the doctrine of the power of Congress to construct roads through States is not a new one in Kentucky, or I might proceed almost ad infinitum to do so. I will not longer weary your patience on this branch of the subject, but will proceed at once to discuss the plain, simple proposition—does Congress possess the power to do what is pro-

posed. The proposition to my mind, sir, is so simple that I regard it as almost self evident. Let us see with what powers the Constitution of the United States does invest Congress. It is clothed with the power to—

"Provide for the common defense and general welfare of the United States;"

"To regulate commerce with foreign nations, and among the several States;"

"To establish postoffices and post roads;"

And

"To make all laws which shall be necessary and proper for carrying into execution the foregoing powers."

When the Federal Constitution was adopted by the people of the United States, a national government was formed, *de novo*—not as States, but by "We, the people of the United States." It is a notorious fact that the question was discussed, and with a great deal of fervor, whether they should form a Confederacy of States, or a National Government; and also that, as soon as it was decided in favor of the latter, some of the members of the convention left, supposing that they had no authority to construct a national government. All the members of the convention except three—Mr. Mason and Mr. Randolph, of Virginia, and Mr. Gerry, of Massachusetts—signed the Constitution when finished, and the objection urged by these gentlemen was that it had too much of the national and not enough of the federal principle in it. Nevertheless, it is well known that Mr. Mason and Mr. Randolph contributed as much as any other two gentlemen toward the completion and perfection of this great and much praised work.

Let us inquire, sir, for a moment, what is a government—the National Government. It is undoubtedly possessed of the sovereign power over the United States. It is independent of any other powers, and has the innate ability to govern itself, and is the only power in the United States that can levy and collect taxes, can declare war, make peace, enter into treaties, coin money, regulate commerce, or do any other act characteristic of national sovereignty.

Now, sir, all these powers or evidences of sovereignty, are actually prohibited to the States by section 10 of article 1 of the Constitution; and if we will read it carefully we will have a much better and truer conception of State sovereignty. Let us look at it a moment. It reads:

"No State shall enter into any treaty, alliance or confederation, grant letters of marque or reprisal, coin money," etc. And

"No State shall, without the consent of Congress, lay any imports, or duties," etc. And

"No State shall, without the consent of Congress, lay any duty of tonnage, keep troops or ships of war in time of peace, enter into any agreement or compact with another State," etc.

Sovereignty, it will be observed, is the right and power to make laws and enforce them. National sovereignty is to exercise this power over the entire nation. State sovereignty is that legitimately exercised over a State, municipal over a city, and parental by a parent over his family. Yet they are all separate and complete in themselves—different in their nature and sphere. But, it is well known that in all cases of supposed conflict of jurisdiction, the lesser must give way to the greater.

This sovereignty of the United States for national purposes does not interfere with the legitimate sovereignty of the States, as manifested in a local or municipal capacity; and that is exactly what is meant to be understood by "the powers not delegated to the United States by the constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people." Everybody knows that the power to enact exclusively State or municipal laws, that is laws affecting only th

individual State, is vested in the States themselves, and not in Congress; it is not prohibited to the States by the constitution, and is therefore among the reserved rights of the States. A State Legislature has the power to levy State taxes, regulate courts of justice, or other local police affairs, and do many other things not necessarily national in their nature; and they are therefore sovereign in their local or municipal character. But they are not sovereign in a national capacity, because Congress in that respect is the only power that can perform national acts, such as levy taxes, make war, regulate commerce, etc., as before stated. For the States to undertake it would be rebellion. Of this we have had enough.

The sovereignty of the United States was inherent, and not granted to it by the States. The idea of granting sovereign power is absurd. True, the term is used in the Constitution, but it is a misnomer. Sovereign power can not be the subject of a grant. The creation of a National Government created a nation, and necessarily invested it with sovereign power, and, really, with all sovereign power, except so far as there are limitations in the Constitution itself.

There can be no nation if there be no government; and a government, to be national, must possess sovereign power over the nation. The powers specified above, viz: to "provide for the common defense and general welfare of the United States; to regulate commerce with foreign nations and among the several States; to establish post offices and post roads, and to make all laws which shall be necessary and proper for carrying into execution the foregoing powers," together with many others enumerated in section 3 of article 1, are inherent to the National Government, and would as necessarily belong to it if not in the Constitution as they do now that they are enumerated.

Let me ask, sir, what kind of a national government it would be that had no power to levy and collect taxes and imports, and to provide for the common defense—no power to declare war or make peace—to enter into treaties or regulate commerce with foreign nations and among the several States, or to coin or borrow money or punish criminals? It would be without vitality—a nonentity—that could not be called a government, and could not exist a day!

If Congress could exercise any one of these powers without an express enumeration of it in the Constitution, then it could all of them; and they are therefore inherent to the national government, as a sovereign national power. Hence in legislating upon these subjects, Congress only exercises its legitimate powers of legislation, and not a granted or delegated power.

The people of the United States in their national character are one people, and the people of the several States are not considered as foreigners to each other. There is but one general government, and in all our intercourse with foreign nations, the United States only is recognized. The Constitution begins with, "We, the People of the United States," and it is also provided that "the citizens of each State shall be entitled to all the privileges and immunities of citizens in the several States." These clearly prove the national and sovereign character of the general government. That I am not alone in my views on this subject, and that it is not "new-fangled," sir, allow me to quote a few words from a very respectable authority, Gen. GEORGE WASHINGTON. In his letter, dated Sept. 17, 1787, he says:

"The friends of our country have long seen and desired that the power of making war, peace and treaties; that of levying money, and regulating commerce, and the corresponding and executive and judicial authorities should be fully and effectually vested in the general government of the Union. * *

"It is obviously impracticable, in the Federal government of these States, to secure all rights of independent sovereignty to each, and yet provide for the interest and safety of all. Individuals entering into society must give up a share of liberty to preserve the rest. The magnitude of the sacrifice must depend as well on situation and circumstance as on the object to be obtained. It is at all times difficult to draw, with precision, the line between those rights which must be surrendered and those which may be reserved; and on the present occasion this difficulty was increased by a difference among the several States, as to their situation, extent, habits and particular interests.

"In all our deliberations on this subject we kept steadily in view that which appears to us the greatest interest of every true American—the consolidation of our Union; in which is involved our prosperity, felicity, safety—perhaps our national existence. This important consideration, seriously and deeply impressed on our minds, led each State in the convention to be less rigid on points of inferior magnitude than might have been otherwise expected; and thus the constitution which we now present is the result of a spirit of amity, and of that mutual deference and concession which the peculiarity of our political situation rendered indispensable."

What a wonderful letter, and how clearly those sages saw the difficulties that were to arise in the history of that country they had sacrificed so much to redeem, regenerate and recreate? What a purpose they had in view—how much they thought for us and ours! Says the venerable Father of our Country, "In all our deliberations on this subject, we kept steadily in view that which appears to us the greatest of every true American—the consolidation of our Union, in which is involved our prosperity, felicity, safety—perhaps our national existence." Next to that immaculate exclamation on the cross, "Father, forgive them, for they know not what they do!" this is the most sublime prophetic exclamation in the history of the world.

Lastly, has the general government, through Congress, ever exercised the powers constituting that national and sovereign character we have claimed for it? We assert, without fear of contradiction, that it has, ever since the adoption of the Constitution, which was in and of itself declared to be the supreme law of the land, and that any law or statute of any State contravening those powers is void, and has been held by the Supreme Court. The most celebrated case in point, is that of *Gibbons vs. Ogden*. Chief Justice Marshall delivering the opinion. (9 Wheaton, page 562.) The points made in this case, and which are deemed to be conclusive, are:

"The laws of New York granting to Robert R. Livingston and Robert Fulton the exclusive right of navigating the waters of the State with steamboats, are in collision with the acts of Congress regulating the coasting trade, which being made in pursuance of the Constitution, are supreme, and the State laws must yield to that supremacy, even though enacted in pursuance of powers acknowledged to remain in the State.

"The power of regulating commerce extends to the regulation of navigation.

"The power to regulate commerce extends to every species of commercial intercourse between the United States and foreign nations, and among the several States. It does not stop at the external boundary of a State.

"But it does not extend to a commerce which is completely internal.

"The power to regulate commerce is general, and has no limitations but such as are prescribed in the Constitution itself.

"The power to regulate commerce, so far as it extends, is exclusively vested in Congress,

and no part of it can be exercised by a State."

These points are almost sufficiently clear and explicit without quotations from the elaborate and exhaustive opinion of Chief Justice Marshall upon the character, genius and power of the National Government. Why, sir, if there had been a better comprehension of the true nature and National characteristics of the powers of the general government, I have entirely too much faith to believe that the American people, or any portion of them, could have been deluded into the late politicians' war, that brought so many sorrows on our beloved land. But, sir, notwithstanding the good seed sown broadcast over the land in the letter of General Washington, in which it is declared that "In all our deliberations on this subject, we kept steadily in our view that which appears to us the greatest interest of every true American—the consolidation of our Union; in which is involved our prosperity, felicity, safety—perhaps our national existence," other seeds were sown—at a later day—not wheat, but tares. These brought forth fruit—legitimate of its kind—rebellion, and our consequent sufferings and sorrows. They are past—and my prayer is, God grant that we, nor our children, nor our children's children, to the remotest generation, may never see the like again:

Chief Justice Marshall says of the Constitution:

"This instrument contains an enumeration of powers expressly granted by the people to their government. It has been said that these powers ought to be construed strictly. But why ought they to be so construed? Is there one sentence in the Constitution which gives countenance to this rule? In the last of the enumerated powers, that which grants expressly the means for carrying all others into execution, Congress is allowed to make all laws which shall be necessary and proper for the purpose."

It is further remarked that "the subject to be regulated is commerce; and our Constitution, as was aptly said at the bar, being one of enumeration and not of definition, to ascertain the extent of the power it becomes necessary to settle the meaning of the word. The counsel for the appellee would limit it to traffic, to buying and selling, or the interchange of commodities, and do not admit that it comprehends navigation. This would restrict a general term, applicable to many objects, to one of its significations. Commerce undoubtedly is traffic, but it is something more: it is intercourse. It describes the commercial intercourse between nations and parts of nations in all its branches, and is regulated by prescribing rules for carrying on that intercourse. * * * No example could more strongly illustrate the universal understanding of the American people on this subject.

"The word used in the Constitution, then, comprehends and has always been understood to comprehend navigation within its meaning; and a power to regulate navigation is as expressly granted as if that term had been added to the word 'commerce.'

"To what commerce does this power extend? The Constitution informs us, to commerce 'with foreign nations, and among the several States, and with the Indian tribes.'

"It has, we believe, been universally admitted that these words comprehend every species of commercial intercourse between the United States and foreign nations. No sort of trade can be carried on between this country and any other to which this power does not extend. It has been truly said that commerce, as the word is used in the Constitution, is a unit, every part of which is indicated by the term.

"If this be the admitted meaning of the word, in its application to foreign nations, it must carry the same meaning throughout the sentence and remain a unit unless there be

some plain, intelligible cause which alters it.

"The subject to which the power is next applied is to commerce 'among the several States.' The word 'among' means intermingled with. A thing which is among others is intermingled with them. Commerce among the States can not stop at the internal boundary line of each State, but may be introduced into the interior."

Now, Mr. Speaker, it seems to me that this ought to suffice to satisfy any candid mind of the power of Congress over the traffic or commercial intercourse between the States, and of the national character of the General Government. But, sir, in contradistinction, let me read further what the Chief Justice says in reference to that peculiar class of traffic that is exclusively under the control of the States, and is, therefore, among the reserved rights of the States. Justice Marshall says:

"It is not intended to say that these words comprehend that commerce which is completely internal, which is carried on between man and man in a State, or between different parts of same State, and which does not extend to or affect other States. Such a power would be inconvenient, and is certainly unnecessary."

Further:

"The genius and character of the whole Government seems to be, that its action is to be applied to all the external concerns of the nation, and to those internal concerns which affect the States generally; but not to those which are completely within a particular State, which do not affect other States, and with which it is not necessary to interfere, for the purpose of executing some of the general powers of the Government. The complete internal commerce of a State, then, may be considered as reserved for the State itself."

Again Justice Marshall says:

"This principle is, if possible, still more clear when applied to commerce, 'among the several States.' They either join each other, in which case they are separated by a mathematical line, or they are remote from each other, in which case other States lie between them. What is commerce 'among' them; and how is it to be conducted? Can a trading expedition between two adjoining States, commence and terminate outside of each? And if the trading intercourse be between two States remote from each, must it not commence in one, terminate in the other, and probably pass through a third? Commerce among the States, must, of necessity be commerce with the States. * * * The power of Congress, then, whatever it may be, must be exercised within the territorial jurisdiction of the several States. * * * The sense of the nation on this subject is unequivocally manifested by the provisions made in the laws for transporting goods by land between Baltimore and Providence, between New York and Philadelphia, and between Philadelphia and Baltimore."

In further illustration the Chief Justice remarks:

"A State, it is said, or even a private citizen, may construct lighthouses. But gentlemen must be aware, that if this proves a power in a State to regulate commerce, it proves that the same power is in the citizen. States, or individuals who own lands, may, if not forbidden by law, erect on those lands what buildings they please; but this power is entirely distinct from that of regulating commerce, and may, we presume, be restrained, if exercised so as to produce a public mischief."

In case of conflict between the laws of a State and the laws of the Congress, Chief Justice Marshall states, that—

"In argument, however, it has been contended that, if a law passed by a State, in the exercise of its acknowledged sovereignty, comes in conflict with a law passed by Congress in pursuance of the Constitution, they

affect the subject and each other like equal opposing powers."

Now, sir, what is the answer to this, the very foundation of the Calhoun theory of States' rights and superior State sovereignty? The Supreme Court, through Chief Justice Marshall, says:

"But the framers of our Constitution foresaw this state of things, and provided for it by declaring the supremacy not only of itself, but of the laws made in pursuance of it. The nullity of any act inconsistent with the Constitution is produced by the declaration that the Constitution is the supreme law." * * * "In every such case, the act of Congress, or the treaty, is supreme; and the law of the State, though enacted in the exercise of powers not controverted, must yield to it."

The Chief Justice closes his elaborate argument by the following remarks:

"Powerful and ingenious minds, taking as postulates that the powers expressly granted to the Government of the Union are to be contracted by construction into the narrowest possible compass, and that the original powers of the State are retained, if any possible construction will retain them, may, by a course of well digested but refined and metaphysical reasoning, founded on these premises, explain away the Constitution of our country, and leave a magnificent structure, indeed, to look at, but unfit for use."

Did any doubt remain, sir, of the power of Congress to enact the bill presented by Senator Sherman into a law, I might quote other authority, but I deem it unnecessary. An honest difference of opinion sir, may exist as to the policy or wisdom, of Congress enacting the law in question, after the judgment of this Senate has been pronounced against it. But, sir, believing that I have clearly proven the right and sovereign power of Congress to act in the premises, being petitioned so to do by States and people, both north and south of our borders, and by the people of our own State, they being the parties most directly interested therein, and to be affected thereby, I can not consent to condemn the passage of the Sherman bill as "an interference with the rights of this State," but must regard it as a legal measure for the regulation of commerce "among" the several States: if Congress in its wisdom sees fit to pass it, I shall acquiesce in its decision, and shall not undertake to place myself in a like position with the bull who undertook to dispute with the locomotive the right of way through the pasture; for, while a disinterested observer might admire his pluck, yet they would be constrained to condemn his discretion. I shall therefore vote against the passage of the preamble and resolutions as they came from the House, and vote for the substitute.

The Chinese prefer railroad work to any other. Indeed it is very difficult to get them to contract for plantation labor. They have heard the fearful tales of the abuse of their countrymen in Cuba and Peru, and have an indefinite idea that planters are necessarily hard task-masters.

An acre of land has been sold in the city of London for \$3,600,000, and in nearly every portion of the city land is said to be increasing in value every year.

The imports of tea, sugar and tropical fruits into the United States for the year 1869 amounted to \$124,000,000, or more than one quarter of the value of all the imports.

The artesian well of Lincoln, Nebraska, throws a stream of brine six inches in diameter to a height of over fifty feet. This stream has sufficient volume and velocity to turn a mill wheel.

A joint stock company for the manufacture of agricultural implements on a large scale is about being established at Staunton, Virginia, with a capital of not less than \$50,000 nor more than \$100,000, in shares of \$50 each.

The best mines in Nevada and California are now in the hands of English capitalists, whose operations in that region are constantly increasing, and succeed where Americans fail, because they work for moderate profits, instead of for pushing up the stock to a high price.

The crown of England contains 1,700 diamonds, and is valued at \$500,000. The crown of Peter contains 887 diamonds. The crown of Ivan contains 841 diamonds. The imperial crown of Russia contains 2,500 diamonds. The crown of France contains 5,352 diamonds.

The Japanese merchants have arranged to ship 200,000 cards of silk worms to Europe.

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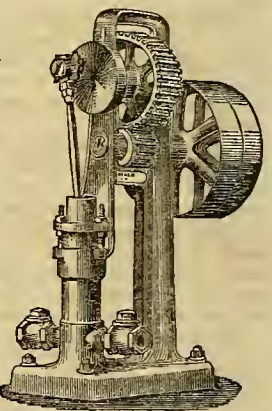
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B. M. WATSON, Old Colony Nurseries and Seed Warehouse, Plymouth, Mass. Established in 1842.

2 2-1. 9.

THE RAILROAD GAZETTE, published in Chicago, by A. N. KELLOGG, is a Weekly Illustrated Journal of 24 pages, as large as those of Every Saturday.

It contains a complete record of railroad news:—the progress of new roads, elections and appointments of officers, contracts let and to be let, summaries of annual reports, illustrated descriptions of railroad improvements, articles both original and selected on railroad operation and civil and mechanical engineering, and discussions of the relations of railroad companies to the community.

This journal is prepared especially for stockholders, directors, and officers of railroads, and all railroad employees. Price \$4 per annum, in advance.

THE FIRM OF WM. J. YOUNG & CO.

Mathematical Instrument Makers, consisting of Wm. J. Young and Chas. S. Heller, was dissolved shortly before the death of Wm. J. Young. The undersigned, the late partner of said firm (who was with Mr. Young continuously for Fifteen Years), will continue in the same line of business, at No. 33 North Seventh street, Cor. of Filbert.

CHAS. S. HELLER.

PHILADELPHIA, August 1, 1870.

29-9-70, 27

The Railroad Record.

E. D. MANSFIELD, - - - - - } Editors.
T. WRIGHTSON, - - - - - }
A. J. HODDER, - - - - - }

CINCINNATI, - THURSDAY, MARCH 23, 1871

The Railroad Record,

PUBLISHED EVERY THURSDAY MORNING,

By Wrightson & Co.,

OFFICE—No. 167 Walnut Street.

SUBSCRIPTIONS—\$3 per annum in advance.

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American Railroad Progress

VAST INCREASE AND RESULTS.

In the RAILROAD RECORD for January and February we published the names, length and cost of the railroads of the United States. Taking that in connection with the statistics of railroads for the last thirty years, the results are most extraordinary. We doubt whether anything equal to it can be produced in the material progress of the world. The aggregate results for thirty years are as follows:

	Miles.	Cost.
In 1840.....	2,167	\$74,215,037
" 1850.....	8,589	296,860,148
" 1860.....	31,195	1,181,285,569
" 1870.....	64,423	2,481,076,120
In 1840, the cost per mile was.....		\$34,250
" 1850, " " ".....		34,500
" 1860, " " ".....		37,850
" 1870, " " ".....		46,000

The total increase of capital from 1860 to 1870 was \$1,299,790,551.

Thus there was from 1860 to 1870 (ten years) the marvelous increase in railroads of 23,000 miles, and thirteen hundred millions of dollars in capital! 2,800 miles of railroad were made each year, and \$130,000,000 of capital were put in them! Where is there any parallel to that in material progress! This is one of the ways in which the nation is increasing so rapidly in wealth. Now let us look at the distribution of these roads, and we shall learn more of this wonderful progress.

Let us compare them by sections for 1860 and 1870, thus:

	In 1860.	In 1870.
	miles.	miles.
New England (6 states).....	3,669	4,506
Middle Atlantic 5 ".....	6,321	10,925
South'n " 5 ".....	5,454	6,154
S. W. incl. Ky., 6 ".....	3,719	5,623
N. W. center (old N. W.) (5 states).....	9,712	15,547
W. of the Miss. and E. of the R'ky mountains (7 states).....	1,840	8,702
Pacific states 3 ".....	74	1,738
Territories.....		1,224

Here we observe that the greatest proportional increase is west of the Mississippi, but we are astonished at the vast increase of railroads in the old North-western States (Ohio, Indiana, Illinois, Michigan and Wisconsin) which in the last ten years have made 6,000 miles of railroad! The aggregate of railroads in these five States is thus:

In Ohio.....	2,638 miles, 1 to each 11 sq. mile
" Indiana.....	3,277 " 1 " 10 1/2 "
" Illinois.....	5,423 " 1 " 10-15 "
" Michigan.....	1,733 " 1 " 33 "
" Wisconsin.....	1,475 " 1 " 36 "
" old N. W.....	15,546 " 1 " 16 "

Now, taking the surfaces of the other sections, we find the following results:

In New England.....	1 mile to 17 sq. miles.
" Middle States.....	1 " 10 1/2 "
" Southern Atlantic.....	1 " 37 "
" South-west.....	1 " 66 "
" West of Mississippi.....	1 " 80 "
" Pacific States.....	1 " 200 "
" Territories.....	1 " 2000 "

Here are two results worthy of note: 1. That the only section which exceeds the old North-west in railroads is the Middle; or, in other words, the immediate vicinity of New York and Baltimore, where nearly all the foreign commerce of the United States centers; but the reader will observe that if we confine ourselves to Ohio, Indiana and Illinois, there is no section of the country exceeds them in the proportion of railroads. In other words, Cincinnati and St. Louis have as large a share of railroads as New York and Philadelphia. 2. We may note another thing, that to bring the proportion of railroads, east of the Rocky mountains, in all sections, up to the population in the old North-west (1 mile to 16 square miles of surface), there must be 54,000 miles (that is equal to all we have now) made. If we throw in the Pacific States and the Territories, it is almost certain to be done in twenty years; so that two thousand five hundred millions of dollars will, in the next twenty years, be added to the wealth of the United States by railroads alone! We see then, in this single department of railroads, how vast, how grand is the material and the social progress of this country! We contemplate the progress of railroads with the more pleasure, as they are really a part of the great social system. They increase the intercourse and multiply the resources of the people. They are bringing the ends of the earth together. It will be hard for the nation to cultivate war, or to retain paganism, or to restrict commerce, or to confine ideas, when the railroad and the steamship have made all nations and all people but one great family.

Knickerbocker Life.

It is a pretty difficult thing to keep the expenses of a great corporation within that mean that shall in no wise impair the efficiency of the management, and yet that shall not be more than is necessary. The tendency is to the extravagant extreme. There are so many opportunities for leaks, and so many of them at times occur, that the most vigilant and faithful officers of such organizations find great difficulty in preventing or stopping them when they have started. And yet to do this is the first and probably the most important step in that system of retrenchment and reform which the first class corporations all over the country inaugurated a short time since, and that is imperatively demanded by all parties connected with these powerful concerns.

To do a very large amount of business is one thing, but if the costs of doing it are beyond a certain limit that makes this business profitable, that is quite another thing. The less of such business the better. And yet we know of companies that parade before the public long rows of figures to show what a vast trade they have done the past year. This is quite alluring to the uninitiated, but the experienced and cautious man wants to know what is on the other side of the account, and what the margin is.

To illustrate better what we mean, let us look at the costs of operating some of our extensive life insurance companies. Take thirty five of the New York companies; and we find that for the year ending December, 1870, according to official reports, that the ratio of expense to all receipts, income, premium and interest, varied from 88.35 per cent. to 14.28 per cent. The first being the highest, and the latter the lowest. Or, if we take the whole of the New York companies, we find from the same authority that the average ratio of expense to receipts is 17.61, and that but six companies are operated down to or below this general average.

Pretty nearly the same relation is sustained if the ratio of expenses is considered in detail, such as the expense to premiums only, or claims and expenses to total income, &c.

There may be, and doubtless are, causes that affected unfavorably some of these companies the past year, that are the natural and unavoidable contingents of the business, and may affect other companies at some future period; but, in the main, are we not warranted in saying that those companies are the best managed, and entitled to the highest public confidence, that do their business at the lowest ratio of expense; and particularly if they have been in existence little or no longer than those that are operated at much greater cost? We think there can not be two opinions upon this question, and that every one will agree with us.

Now let us look for a moment at the busi-

ness of the company whose name we have placed at the head of this article, the Knickerbocker Life of New York. We select this company because it illustrates, in all particulars, what we are attempting to establish, better than any other.

This company is not yet twenty years old (organized, if we remember right, in 1853.) Its total assets are \$7,398,991. Last year, 1870- it issued 5,625 policies, received in premiums \$4,286,837. Its income for that year was \$4,743,295, and it paid death claims in the sum of \$896,200, and dividends to the amount of \$427,351.

This is a large business, and yet, whilst it is much beyond that of many of the companies of New York, it is below that of a few of the old companies of that State. It received 1,992 policies above the average number taken by all the companies of that State, which insured \$6,664,078, over the same general calculation, and received in premiums \$2,932,121 in excess of the average receipts.

Now let us see how it stands, comparatively, in the ratio of expenses.

The average ratio of expense to income, premiums and interest is 17.61—of this company it is only 14.28. The average ratio of expense to premium only is 20.14—of this company it is 15.81. The average ratio of claims and expenses to total income is 35.22. The Knickerbocker shows but 33.18. Thus it will be seen, in the business done, this company is largely above the average, whilst in ratio of costs it is as handsomely below.

This is what we mean by retrenchment and reform, by "keeping the expenses of a great corporation within the *mean* that shall in no wise impair its efficiency, and yet that shall not be more than is actually necessary." Such a business is always safe because always profitable. The financial storms that dash other proud corporations to pieces, but strengthens such an one as this. It is founded upon correct principles, managed honestly and wisely, and needs but to be known to be appreciated and patronized.

—Mr. James Fisk, Jr., has filed a bill against the Union Pacific Railroad Company and Credit Mobilier, praying that they be restrained from all operations. Mr. Fisk claims 5,000 shares of the stock of the Union Pacific Railroad Company, which the latter refuses to deliver, withholding also his rights as a stockholder, thus damaging him to the amount of \$4,500,000, which sum he seeks to recover.

—They have a steam shovel on the Mississippi Central Railroad which takes from the solid bank of earth and loads a train of eighteen dump cars in thirty-nine minutes, carrying out about seventy-five cubic yards of dirt.

—The railroad bills that passed the Nevada Legislature provide that no Chinamen shall be employed. The penalty is a forfeiture of their privileges.

—On the average throughout the year, one railroad train per minute leaves London. That would be 525,000 trains a year.

Gallipolis, McArthur and Columbus Railroad Company.

This organization was recently effected for the purpose of reviving an old project, and to meet the demand for a railroad from Gallipolis into the interior of the State.

It starts out with great advantages, and if its affairs are properly directed, as we have no doubt they will be, there is every reason to believe, its road will become one of the most profitable in the State.

Already, an old work, with considerable right of way, worth a large sum of money, passes into its possession as a gratuity, and so great is the local interest in this undertaking that large subscriptions have been made to its stock interests, and there are the strongest evidences that soon the requisite means will be supplied to enable the company to grade the road, and place it in first-class credit, when its completion becomes beyond question.

The contemplated route for this road is one of the most natural that can be pointed out. Extending from a river front at Gallipolis, a natural business center, with considerable capital and established trade, back into a country that abounds with all the industrial resources that are necessary to sustain a dense population, and create a most extensive and profitable commerce. Besides, connecting with other roads a few miles distant from the river, that lead to all important points in the East, West, and on the Great Lakes, and what is of equal importance, becoming a part of the great Virginia thoroughfare in its reach for a share of the traffic of the interior.

It seems to us that this movement is exceedingly propitious. The railroad spirit is fairly aroused in all that part of the state. More so, we believe, than in any other part of it. The value of the coal, iron, stone, and timber, that lie there in such profusion, is fully appreciated. They are bound to be called quickly into requisition, and made to pay their share of tribute to the common wealth of the country. There is a demand for them at the trade centers for conversion into the wares of commerce, as well as in the lower Ohio and Mississippi countries, for ordinary consumption. The great agricultural flow has passed beyond this State to the west, and now the new era of mineral and manufacturing development has begun with us, and these sources of wealth, that have so long lain dormant are coming into use, and promise to inaugurate the most remarkable prosperity that has ever befallen us.

If this is true, what a glorious future awaits the country this railway is intended to traverse? It has every native element to produce the largest results, and it needs but the advantages of this enterprise to attract thither capital and skill, by which these long concealed fountains of wealth will be opened, and their golden harvests gathered for the common good of

every individual and interest affected by its success.

It ought, therefore, to be aided vigorously by every one of its beneficiaries. Its prosperity ought to be made common cause with the people of every town it passes through or near, as well as those of the country it will be built to supply. Such unanimity in such a country and among a people with the pecuniary capacity they possess, would make short work of this undertaking, and within the coming year, or eighteen months, at the furthest begin to realize something of the benefits this road, in full operation, is sure to bring them.

Within a few weeks good men have been selected for the management of this important work. They have a deep interest in its success, and to our personal knowledge, are working constantly and zealously for its welfare.

Now let them be supported by a right hearty good will, and we predict it will soon be apparent that public confidence has not been, in this case, placed amiss.

Commissioner Wright's 1st Vol. for 1870.

The first volume of Commissioner Wright's Report upon Railroads and Telegraphs, for 1870, is in our judgment one of the most valuable works yet issued upon these important interests in this or any other State.

It seems to us that it is precisely what is needed to give our people an intelligent understanding of the legal status and relations of the railroads of the State. They have undergone such extensive and rapid changes within the past few years, that it has been about impossible to keep up with them, and the best of our lawyers, as well as railway managers, have sought in vain for such facts as are readily found in this volume.

Here are all the laws of Ohio that relate to railroads, with copious notes of Supreme Court decisions upon them, and the laws of Congress that relate to railroads; and the charters of the various companies of the State, whether existing under special charters or the general law, and all the amendatory acts of the Ohio Legislature relating to these works, and the leases and sales, and capitalizations, and reorganizations and consolidations that have taken place in our railroad affairs up to the present time, and these are chronologically arranged, with reference to the laws of this and other States, by which these organizations and changes are effected.

The work is gotten up in law style, as it should be, with good paper and type, and with abundant marginal references, and a complete index.

Already we have used our copy so much that we hardly know how we ever got along without it. And how every lawyer and railroad manager in the State can afford to be without it long, we can't very well understand.

Mr. Wright has done the State and the railway managers thereof great service in giving them this volume. It could hardly have been obtained in any other way than through a duly appointed officer, with powers, etc., as are given the Commissioner. It gives evidence of great labor and patience on the part of Mr. Wright, and considering the other work imposed upon him, and the fact that he has but one assistant in his office, reflects great credit upon his ability for, and interest in the duties of the position he so creditably occupies.

Newark, Somerset and Straitsville Railroad.

Mr. J. S. Birkey, of Newark, Ohio, who is managing director of the Newark, Somerset and Straitsville Railroad Company, made us a pleasant call a short time ago, and posted us up upon the progress of the work and the prospects of this important road.

This is an old scheme that has passed through about every stage of affliction known to the history of such enterprises, but at the same time it has lost none of its value or importance, and is likely soon to be made a living reality. The present company are working under a most admirable financial policy, at once sound and effective. They have secured local assets adequate to the completion of the grading of nearly or quite their whole line, and to the ironing and equipment of the first section from Newark to Somerset, a distance of twenty-four miles. With these means they have finished this first section which is doing a good local business, and they are moving ahead rapidly with the grading to the immense coal beds of Straitsville. They pay promptly and keep themselves clear from the embarrassments of a floating debt.

Such a programme if persisted in must give the company high credit in the money markets of the country, and when they offer their bonds upon such a basis as they will thus secure, there will be but little or no difficulty, we think, in finding purchasers for them at good rates.

As a local undertaking this is one of the most promising we know of in our State, it will form the missing link in another direct line from the Ohio river to the lake, and passing through a country remarkably blessed with a most fruitful soil, extensive formations of a most valuable building stone, salt springs that will return handsomely upon the investment that renders them productive, vast deposits of the richest bituminous coals, iron ore of almost every variety and quality, and in great quantities; and timber of the hard wood species equal to a most extensive demand. Such resources, stimulated into commercial utility, must give a business to this road at once certain, continuous, and largely profitable upon any cost it is at all likely to require.

There is a future to this road even beyond this splendid local traffic. When it is com-

pleted to the line that shall be the extension of the Chesapeake and Ohio road, now so far advanced toward completion, it will have a connection to the new city upon the sea-board and play a most important part in the immense trade that will find this route from Central Ohio to this favorable point of transit to the marts of the world.

We know the gentlemen in the management of this road. They are worthy of the highest public confidence, and will prove themselves equal to their undertaking.

Cincinnati & Mackinaw Railroad.

GREENVILLE, O.

We notice from the papers that the people of Greenville, Ohio, have had a conference for the purpose of reviving the work upon this grand old scheme. The meeting, we learn, was largely attended by the best citizens of the place, and after the usual talk about the matter, a subscription of \$10,000 was at once secured, and a pledge to increase this to \$30,000 was given, provided the effort to resurrect the work was encouraged by the people along the line of the road.

The better to know what is wanted, the services of P. Pomeroy, the former engineer of the work, and a man we know well and will swear by, was secured to pass over the line and estimate the cost of placing the roadbed from Greenville to Van Wert in a condition that will render it so attractive to capitalists that they *must* and *will* take and finish it.

We are promised these estimates as soon as they are made. When they arrive, we shall make such use of them as will be of benefit to the managers of this work, in a place and in a way that they can't probably themselves reach.

As a preliminary movement this is a good one. It ought to be followed up vigorously, because at this time, and with the surroundings of that road, a good zealous effort to complete it is sure to be successful.

There are many unfinished roads in the West that are being revived under the flush of railway prosperity, that are not comparable to this one, either in local necessity or profit, or as important links in a great thoroughfare, demanded by the times and the rapid development of the extensive resources of a country hitherto unproductive.

This work should go on without cessation, and it needs but a hearty co-operation of all the interests affected to complete it within the coming twenty months.

—The territory already given to the Pacific Railroads of this country is larger in area than that of France! It would accommodate the entire population of the United States. The land we have given to railway corporations in this country is greater by some thirty millions of acres than the united areas of France, Italy, and United Kingdom, which have an aggregate population of 90,000,000 of persons.

Sharp Practice.

If you want to see just the keenest, sharpest practice that the human brain can be twisted to, just watch the movements of the chief fnglemen of a railway company that want to drive another such company to terms, or that seeks to obtain some particular advantage that this other company may enjoy. The tricks and frauds of the stock market or the gold room are nothing to it.

The last dodge about here, as we are informed, is to quietly yet quickly get a bill through the Legislature, the title of which shall be the farthest possible from conveying the idea of the text, and that is so obscurely worded as to seem fair and unobjectionable, and to conceal the true purport and intent of the law, but which will give any railway company that may desire it the right to the use of any other railway company's tracks that may be laid upon the street or streets of any town or city in the State. Or, if more than this is wanted, the right to condemn such track or tracks, or the whole street upon which they may be placed.

If this is not about the coolest piece of corporate impudence on record, we are much mistaken.

Why not just condemn for use the whole of the track of some competing organization, and be done with it at once, and thereby rule out an annoyance and a restraint upon the greed of a monopoly? It would be easy to get appraisers who know nothing about the value of such interests and who could therefore soon learn not to put it too high; or such a movement could be made to involve the company owning such tracks into a protracted and costly litigation, by which its stock would be affected, and its credit, for a time at least, impaired. Such refractory companies ought to suffer somehow, and this is probably as good a way as any other, if not the best.

Years of occupation and use, vested rights, the cost and trouble of building up a valuable business, are all nothing, it seems, and are to be treated as "trifles light as air."

The game however will probably be blocked. Its tricks were discovered in due time, and are being ventilated. This is all that is necessary to insure the whole hill a good hearty kick out of the Legislature; and it is a pity a similar application can not be administered to its projectors.

"For ways that are dark, and tricks that are vain," commend us to some railroad projectors.

A MOVE IN THE RIGHT DIRECTION.—On 'Change, President C. W. Rowland on Monday morning appointed the following Committee on Southern Ohio Railroad, from Cincinnati, via Hillsboro and the "Jackson Coal-fields," to the mouth of Symmes creek, to connect with the Chesapeake & Ohio Railroad: Thos. R. Biggs, Ahner L. Frazier, and John Grubb. The above gentlemen are to co-operate with Col. W. H. Trimble in securing one-half the money for the survey of a part of the above line from Hillsboro to Cincinnati.

Dayton & Cincinnati R. R. (Short Line), Election.

For some years this company has done little more than keep up its organization. It has been, like many other good enterprises, so entangled in the meshes of the law, that every effort made to rescue it but embarrassed it the more.

Within the past year, however, the net has been cut in so many places, and so thoroughly, that now it bids fair to come out clean and stronger than ever.

During the long period of stagnation through which the work has passed, it has lost none of its importance, and, in a general sense, none of its value. It is a greater necessity to-day than when it was concocted, and all attempts to find a better entrance, or a cheaper one, into this city from the north have signally failed.

Importance is added to this project by the proposed construction of railroad lines in the interior of the Miami valley—by the building of the railway bridge across the Ohio river—by the prospective development of the vast and varied resources of the South, and the construction of the Southern road; and particularly by the success and importance of the Chesapeake & Ohio road.

It is for these reasons, we suppose, that the stockholders of this old tunnel route, as well as the people generally who are anxious for its success, have revived their interest in it, and that a trifle over six thousand shares were voted at the company's annual election of officers, on the 21st inst.

This meeting was harmonious throughout, and resulted in the selection of the following officers for the coming year:

A. J. HOODER, President.

R. BERESFORD, Treasurer.

G. B. ELLARD, Secretary.

Lebanon.

For some time we have known that there was a substantial movement to build a road from some point on the Little Miami road to Dayton via Lebanon.

From the following dispatch to the daily papers of our city on Monday last, it seems the movement has taken definite shape, been given to the public, and is meeting with success.

LITTLE MIAMI, LERANON & DAYTON R. R.—The stock books of the Little Miami, Lebanon & Dayton Railway Company were opened here yesterday afternoon, and over ten per cent. of the capital stock was immediately subscribed by our leading citizens.

HOLLY WATER-WORKS AT IRONTON OHIO—The contract for the erection of Holly Water-works buildings in Ironton, Ohio, has been awarded to R. T. Coverdale, of Cincinnati, for \$58,786. This includes the putting down of three and a half miles of the mains, the work to be completed by the 1st of October next; the machinery to be furnished by the Holly Manufacturing Company, at a cost of \$36,200, and is to have a capacity of two million gallons each twenty-four hours.

A Plea for Narrow Gauge Railroads.

[From the Railroad Gazette.]

OFFICE OF PAUL BROTHERS, C. E.,
AKRON, OHIO, Feb. 15, 1871.

MESSENGERS EDITORS:—In your issue of January 28, some criticisms were made upon narrow gauge railroads, and in the course of your article some extracts are made from a pamphlet which advocates the introduction of such lines.

As we are the authors of that pamphlet we take the liberty of replying to the article.

In order to more fully substantiate our course, we desire to introduce a few more paragraphs from the pamphlet:

"We find in the report of the Commissioner of Railroads for the State of Ohio for the year 1868, a list of the thirty-five railroad corporations then existing in the State, and that of this number, representing 3,200 miles of road, only seven representing 540 miles of road, or but one-sixth of the entire length, paid interest and dividend from the start.

"Other roads, with an additional length of 770 miles subsequently became profitable, making the number of paying roads at that time some 40 per cent. of the whole length.

"We find also many roads sunk every dollar of their capital stock, the loss in this way amounting to nearly forty millions of dollars.

"Other roads were mortgaged for more than they were worth, thus entailing loss on the part of the holders of their bonds, and it would not overstate the case to say that in Ohio the losses from entire and partial sacrifice of stock, and on capital advanced in the shape of loans, etc., would amount to sixty or seventy millions of dollars.

"The history of railroads in other States is the same as in Ohio—one of financial embarrassment and failure—and it is worth our while to enumerate examples to show the great losses which have been sustained in railroad building.

"The unprofitable nature of railroad investments is something every one is aware of, and so generally is this understood that capital is invested in them, not with the expectation or scarcely a hope of ever realizing from it as a direct investment, but for considerations of a wholly different character.

"That by opening a new avenue of communication it may stimulate business, develop resources, and enhance the value of real estate, or as a means of competing with rival towns, prospering under the effects of railroads they have opened.

"These are the considerations which influence the building of railroads, and the required capital is generally contributed, not from the accumulations of capitalists, but withdrawn from productive industry, paid by anxious, struggling, enterprising men, who can ill afford the loss of the money, but hope for an increase of business and profits from the effects of a railroad."

We desired to show that the reason why railroads have proved to be so unprofitable was from their great cost, and to show that, if a cheaper system could be adopted it would be a move in the right direction.

In what way can this cost be reduced?

The principal items of cost in building railroads are the superstructure and equipment.

As to the cost of superstructure, you criticize the estimated cost of a 5 ft. 6 in. and 3 ft. 6 in. line in Canada.

It is worthy of remark, that while this estimated cost is largely in favor of the narrow gauge, it would be still more so were the prices brought up to the American standard.

You ask "Why?" Can we use a lighter rail on a narrow gauge than we can on a wider one? And inasmuch as you change the Canadian estimate by putting the weight of the rail the same in both cases, we must understand that you claim that no saving can be effected in weight of rail.

As the weight of rail is determined by the weight of cars passing over it, we will pass the point and proceed directly to consider the main question as involved in the weight of cars. You claim that on branch lines of ordinary gauge the weight of cars can be reduced to the same proportion of dead to paying weight as is now used on the narrow gauge.

Is it not true that, however much you may reduce the weight of cars on the ordinary gauge, on a narrow gauge they could be still more reduced and still have the same strength?

You instance street cars as carrying but little dead weight and affording as good results as any narrow gauge.

Do you not know that street cars are only drawn at low rates of speed, by horse power, and are never bunted violently together or subjected to the usage they would be were they put in regular trains?

The weight of cars depends, to a certain extent, upon the service to be performed by them, but more upon the treatment they receive.

We find this very subject treated of in a leading editorial article in your paper, of November 12, in which you say: "Cars must be built for the rough usage of people who have no interest, or at least take none, in handling them carefully." And that "Master Mechanics who so seldom receive credit and so often censure, are prone to act on principles which are safest to themselves."

We are surprised to find lightly constructed cars recommended so soon afterwards in the same editorial columns where you have so fully stated the objections which have prevented their use.

Supposing, however, that on a branch line from here to Cleveland such cars were introduced.

The advantage over the narrow gauge that you claim would result from their use, would be in saving break of bulk.

Would you send those cars from Cleveland to Chicago, or New York, sandwiched between heavy cars, in long trains, and bunted and jammed by heavy locomotives?

However carefully and tenderly they might be used upon their own line, they would be subjected to harsher usage on other lines than they could bear, and monuments of the folly of such an undertaking would be strewn along the lines wherever you sent such cars.

The concluding objection you have made to narrow-gauge railroads, even for branch roads in new countries, is that "they may, in a majority of cases, reasonably expect to develop, in time, a business which will require a wide gauge to accommodate it."

We might here discuss the relative capacity of the gauges, but think we had better first inquire what amount of capacity is required, as upon this point some writers seem to have gone very much astray.

We think that, as a general thing, "branch roads in new countries" need not trouble themselves about the capacity they may require "in time," and, in fact, most "branch roads," and some roads which call themselves "great through lines" in some of the older States could have done all the business they had to do and been run with more profit to the stockholders had they been built with one-half their present capacity or cost.

In fact, the report of the State Engineer and Surveyor of the State of New York, for the year 1868, shows that the average number of trains passing over the roads of that State was only eleven and a half per day.

But supposing the business *did* increase to such an extent that a wider gauge would be considered necessary. We will say nothing about double tracking, but say a third rail might be laid and thus run both wide and narrow cars on it at the same time.

It would *not* be necessary as you say, "to make a violent change," or that "all the rolling stock be replaced with other of entirely different construction."

We can refer you to examples in support of this.

We have seen trains on the Oil Creek Railroad, in Pennsylvania, composed indiscriminately of cars of 4 ft. 8 in. and 6 foot gauge, the company having a third rail, while in Ohio the Mahoning Division and the Cincinnati, Hamilton & Dayton, both roads of the ordinary gauge, are double railed to pass the trains of the Atlantic & Great Western with a gauge of 6 feet.

In answer to your question "why can we use lighter rail?" we will say we have shown what governs the weight of rail to a great extent; but when we wrote our pamphlet we had considered your plan of light rolling stock to save break of bulk, and found it impracticable, for the reasons we have before stated, and our comparisons are drawn from roads now in operation and not from a class of rolling stock that was abandoned years ago.

Having considered all the objections you have raised against narrow-gauge roads, let us consider whether we can materially reduce the cost of railroads by using a narrow-gauge, and in so doing we can make further use of your own article.

In your criticism on Canadian line, you show that it is cheaper, even by your own figuring, than your own plan of light cars which you propose to use.

In another place in the same article you say: "That the cost will be somewhat less if the rails are placed nearer together, we will not deny," and in another place, "We do not, of course, intend to say, there are 'not circumstances in which it will not be an advantage to place the rails nearer together,'" instancing a coal-mine as an example where it would be "impossible" to place them far apart.

We can show you coal-mines where there would be no difficulty in using cars of a 4 ft. 8 in. gauge, and the reason why coal roads in this vicinity have been built on a narrower gauge, is mainly because such roads have been considered far more economical.

You instance a temporary road for excavating and removing earth as an example where it might be advisable to use a narrow gauge.

If it would be advisable for earth, why not for minerals, grain, or merchandise?

"The discounts of agents, brokers and middlemen," are referred to in our pamphlet as swelling the cost of railroads, and we think we can explain what we mean by it.

A railroad 50 miles in length, we will not over-estimate it if we say it costs \$30,000 per mile: total cost, \$1,500,000.

From two to five hundred thousand dollars (scarcely ever exceeding the latter figures) is raised by stock subscriptions. The balance is borrowed money obtained by mortgaging the road. First, second, and even third mortgages are resorted to—the former bringing in some cases nearly their par value. The second and third mortgages are sold at great

sacrifices and by paying large commissions.

Could we build a road for \$1,000,000, it would stand a far greater chance of being a paying road.

The sacrifices, etc., were made in raising the last half of the money required to build the road, and in many roads the last \$500,000 in bonds scarcely realized half that amount, because of the uncertainty of the enterprise being a paying one for the amount of capital required.

We will not here discuss whether some of the existing lines that are doing a large and profitable business might still further increase their dividends by changing to a narrow gauge. Our present purpose is to recommend a system that will make railroads pay where they would not if built upon the ordinary plan.

Are there not a good many railroads in the country where a saving of two or three thousand dollars per mile would have saved a great many individuals and communities from bankruptcy?

You admit the narrow gauge to be cheaper; so do we. And now Ohio is suffering for want of more mileage of railroads and not for want of capacity on the present lines; as there is not a road in this State that could not do more than it is now doing. Now how shall we double our mileage? Go over our old ground and sink another *sixty millions* of dollars, and in the end have a few large corporations buying our roads when we are bankrupt, and then keeping our industrious mechanics and farmers poor by their unjust taxation for the transportation of our freights? Or shall we build narrow-gauge roads which we can afford to own and operate to the advantage of all, and which, instead of being a constant drain on us, will be a source of revenue to our citizens. PAUL BROTHERS.

A Narrow Gauge Railway Scheme.

The following is the plan proposed by Mr. F. R. Deland, Superintendent of the St. Paul and Pacific Railroad, for a system of narrow-gauge lines for the agricultural district of Minnesota, and designed as feeders for the main lines. The application of the plan, however, does not seem to be limited to any one locality:

"In my opinion, we have reached the point at which the narrow-gauge system comes to relief. A varied experience since 1839, with the American railroad system, all the way from Massachusetts to Minnesota, leads me to the following conclusions:

"That from the rapid construction and consolidation of trunk lines, and the varied requirements of patrons thereof, it is necessary that the lines across our continent, from east to west, should be composed of four tracks, 4 feet 8½ inch gauge—two for passengers, and two for freight, with sidings at every ten miles.

"The whole business of these lines should be governed by the speed of the trains.

"Passenger trains denominated first-class should have a time card of 50 to 60 miles per hour, on which all willing to take the risk could travel, and the price per mile would be in proportion to the expense of maintaining such trains.

"Second-class passenger trains at a regular speed of 25 miles per hour.

"Third-class passenger trains at 15 miles per hour.

"For passage on either class we would pay our money and take our choice.

"On the freight tracks there would be run four classes of trains.

"First-class, 25 miles per hour; second

class, 15 miles; third class, 10 miles; fourth class, 6 miles; and the price of freight in proportion to speed. If you are in a hurry, pay for it. From these trunk lines, side lines of the same gauge, but with generally a single track. From these, and also from the trunk lines, the narrow gauge, 3 feet, 30 inches, and 2 feet will come in to the relief of all, and will be emphatically the country roads—the farmer's road.

"The narrow gauge will have its cheap road, bed, culverts, and bridging, will have its light track, will have its small engines and cars; all will be of as good workmanship, and as comfortable and convenient for both passengers and freight, as the present cars; and all can be accommodated by having roads; and they will pay for the transportation such sum as the speed at which they wish to move demands.

"The cost of the four track line would be from \$100,000 to \$150,000 per mile.

"Cost of the single or double 4 feet 8½ inch gauge side-lines, from \$30,000 to \$80,000 per mile.

"Cost of the narrow-gauge, from \$6,000 to \$10,000 per mile, as per locality; and when the narrow-gauge line should become too heavily taxed, or extended in length beyond what was intended in its inception, it can easily be converted into a 4 feet 8½ inch gauge by widening its embankments and excavations, extending culverts, making stronger bridges, putting down new ties and iron, and using your narrow-gauge track and equipment where its location is required."

Magnetic Motive Power.

If we mistake not, we are in the dawn of a new and economic motive power. We are strongly induced to hail magnetism as the coming worker for millions of men and for purposes innumerable. Some will smile at this. It is right they should. The idea has been discouraged by electric writers as visionary and impracticable. They have asserted the impossibility of any such economic use of material for the production of magnetic power, as could ever justify the hope of its substitution for steam. They were right so long as the battery was regarded as the source of power instead of a mere initiative, such as results now seem to prove it to be. Our theories of electro-motive force may require it be re-examined and, perhaps, changed. The axiom that a given magnetic force is the exact product of a given consumption of zinc or chemicals, must now be challenged and put to proof. We confront now the proposition that, although the electro-motive force may be in the battery, yet that the magnetic power which follows its application is capable of indefinite enlargement without increase of the initiative agent. We are brought face to face also with the fact that when a magnet is performing its maximum work, the battery which started the magnetic power is most at rest! In other words, that the magnetic power is not proportioned to the size or consumption of the elements of a battery, although dependent upon it as an initial force. We do not pretend to explain this problem, but we can tell what we have seen.

A few days ago we accompanied, on invitation, several gentlemen to the works of Mr. H. M. Payne, of Newark, N. J. On a small shelf we found a Daniells battery of four cells, the ingredients of which were the hi-chromate of potash in the porous cell, and diluted sulphuric acid, of ordinary strength, in the outer vessel. It was entirely inodorous. Beneath it, firmly bolted to the floor was an iron circular frame,

of a diameter of about eighteen inches, the width of the periphery or rim being about five inches. Five apertures equi-distant were cut into the edge or face of this iron case, three and a half inches in length and of the width of the frame. Into these were inserted the faces of five iron cores, coiled with what seemed to us No. 14 covered copper wire, standing out from the frame and firmly fastened thereto. In the interior was a wheel, on whose rim were set six additional magnets, the same as on the iron case, and so set that the faces of the magnets in their revolutions would meet each other at different yet regular periods, corresponding with the double crank device in locomotives to prevent a dead center. By acting on the periphery, all waste of power was of course avoided. On the shaft which extended from the magnet wheel, there was placed a belt wheel of the usual diameter, connecting with a wheel shaft on the ceiling, which in its turn, was connected by a belt with a circular saw on a bench. No power was gained by the diameter of the wheels, as they were all equivalents of each other. The wires were then connected, when, on the instant, great rapidity of motion was at once acquired, the floor of the room shaking violently with the power developed. Pieces of wood were sawn rapidly, and without apparently disturbing the rapidity or evenness of the motion. Two gentlemen, weighing 170 pounds each, endeavored to stop the motion of the wheel by the pressure of a concave break, having a surface six inches by four, bearing on the belt wheel, but without visible effect. This rapid and effective action has been watched nine consecutive hours by investigating parties, without any perceptible decline of power, and with a consumption of less than half a pound of zinc, a cost of less than half a cent per hour. The power development was rated at two-horse, and can be maintained for twenty-four hours without intermission at a maximum cost of ten cents. Such, at least, is the statement made to us by Mr. Payne, and confirmed by a well-known gentleman, who thoroughly examined it. By increase of diameter and width, or by multiplication of wheels, and the number of magnets, the power can be largely increased, so we were assured, *by the same number of cells*. This was proven by the fact that by the addition of wire in the circuit of sufficient length to surround another set of magnets, no diminution of power was apparent, although the action of the battery was necessarily less; thus another wheel with similar power could have been added. The four cells we saw were stated as capable of maintaining the speed and power produced in our presence for sixty hours without renewal, at the cost of about a single stage fare on Broadway per day.

In this machine, so utterly simple as to challenge the scrutiny of the most ordinary mind, we see the dawn of a new power, capable of endless application at a minimum cost, and destitute of the usual element of danger. It occurs to us very strange that what is just being proposed as a possible status of facts by a learned divine in England, should prove the self-same theory which an American citizen has been privately and persistently developing in actual practice for years. To what it may give rise we have no prophet's ken to tell. If the premises demanded are proven to be correct, its application is infinite. We may yet see the Atlantic crossed by huge vessels, propelled without an ounce of coal, by a power the initiative of which the captain may place beside his writing desk in his cabin, which a child can apply, and the littlest finger may stop.—*Journal of the Telegraph.*

Metallic Railway Cars.

That iron cars must be heavier than those of wood is the main reason urged against their adoption, although their liability to be hotter in summer and colder in winter may have had considerable to do with the manner in which they have been ignored by railway companies, despite their manifest and, we may add, their manifold advantages. But it appears that weight alone is not, after all, so great a fault in some varieties of railway vehicles; at least this is the inference to be drawn from the sleeping and drawing room cars, weighing in the neighborhood of thirty tons, which have of late become quite common, especially on western roads. The reason why weight is a drawback in the one case and not in the other undoubtedly exists in this, that the one giving comfort and pleasure in traveling is made to pay, while the other affording only safety is not. Still we hold, as we have always done, that iron is the only material fit for use in the construction of railway cars, and believe that, if one half the attention was devoted to perfecting the application of metal to this purpose that is now expended in the decoration of wooden cars, our railways would soon be supplied with cars as light, as comfortable, and nearly or quite as cheap as the combustible and easily splintered affairs now running on all our railways.

Probably there has never been, in this country at least, a railway car made with proper choice of material and proportion of parts. In such, the structure of the trucks might, perhaps, remain essentially unchanged, although iron in the place of wood would even here be preferable. But the car-body would necessitate a careful combination of steel and iron to unite all available lightness with strength to support the superincumbent load. With these, for all passenger traffic, would need to be used some means of avoiding the undue heating of the car in summer, and the contrary result in the colder seasons of the year. This would be found in the employment of some preparation of paper or woody fibers finely comminuted, and made fire and water proof by chemical treatment, which, by the way, might be extended even to the upholstery. This done, and proper appliances provided for illuminating and warming, we should have a railway carriage combining the advantages held most important in wooden cars, with those acknowledged to be possible only in iron ones.—*Artisan.*

IMMENSE GAS COOKING STOVE.—The London *Mechanics' Magazine* gives an account of a gas cooking stove, manufactured for the Earlswood Lunatic Asylum, and capable of preparing a dinner for one thousand persons. It measures 16 feet in length, 6½ feet in height, and 2½ feet in depth, weighing about three tons; and is so constructed as to perform every variety of cooking required under any circumstances, with the exception of boiling or steaming, for which other provision is made in the asylum. The gas when used is mixed with atmospheric air, and the stove is calculated to consume 150 feet of gas per hour. Many advantages are claimed for this stove, both on the score of economy and convenience. It is stated, as the result of experiment, that the loss of weight in cooking 184 pounds of meat, was only 18 pounds, while the loss in cooking the same amount by a coal fire was 34 pounds.

—About thirty days grading remains to be done on the Peoria & Rock Island R. R., as we learn from the Cambridge democrat.

Pacific Railway Through Traffic.

The most visionary among our railway projectors never, in their wildest dreams, foresaw the results which have so speedily followed the opening of avenues of traffic from the great Lakes to the Pacific coast, the completion of which project has inaugurated a new and startling state of affairs.

The arrival of the Pacific Mail steamship, Great Republic, at San Francisco, with the large freight of 1,700 tons of teas, silks, etc., shows the increasing trade with Eastern Asia over the Pacific roads. Of this cargo, 270 tons, comprising 5,700 packages of tea, are for firms in Chicago to be sent over the road. It is stated that the Pacific Mail Steamship Line can obtain freight enough for its vessels to run double the number of their present trips to profit. The direct trade with China by Western cities is becoming established, and is the result of the Pacific railroads. The saving in freight forms an important item. The advantages of the roads to this trade with China are working greatly to the benefit of the Pacific coast and Western States, as well as New York. Another unlooked for result and rather singular fact—until explained—is, that the receipts of bullion from the Pacific States are on the increase in New York, and falling off at San Francisco. The explanation is, that so many of the mines are near the line of the Pacific road, that New York is found the more convenient market without much additional expense. It is, perhaps, probable, if not fully admitted in California, that although the Pacific road may have thus far brought no very decided advantage to the trade of San Francisco, either in merchandise or bullion, that it will be very likely to become a great distributing mart for foreign merchandise and domestic produce, since it is reasonably certain that the great bulk of California staples will naturally continue to be drawn to that point.

The following is a statement of through freight forwarded to the East over the Central Pacific Railroad, in January, as furnished by C. W. Smith, General Freight Agent:

Wine, lbs	105,454
Cotton, (Tahitian).....	31,275
Tea.....	457,177
Wool.....	97,040
Leather.....	177,317
Silk.....	82,174
Hides.....	4,634
Quicksilver.....	20,475
Hops.....	4,474
Arms.....	14,970
Straw Hats.....	8,528
Glue.....	4,477
Fish.....	9,501
Lumber and Shingles.....	98,603
Unspecified Merchandise.....	406,087

Total for January.....1,521,988

All the above specified freight was from San Francisco, except the lumber and shingles and 26,000 lbs. of the wine, which went chiefly from Sacramento.

☛ The first iron vessel built in England was a canal barge 70 feet long, 6 feet 8½ inches wide, built of 5-16 inch plates, at Birmingham, in 1787. The first iron ship that went to sea was the Aaron Manly, built near Birmingham, and put together in London in 1820.

☛ Wisconsin furnished nearly 250,000,000 feet of lumber during the past year.

Railways in the United States.

There are now in the United States 50,000 miles of railroad. The cost of these works exceeds \$2,000,000,000. Their annual earnings exceed \$400,000,000, and equal \$11 per head of our entire population. They transport, annually, 125,000,000 tons of freight, or over three tons to each person, assuming our entire population to be 40,000,000. The value of their tonnage, at the low estimate of \$100 to the ton, equals \$300 per head, and an aggregate sum of \$12,500,000,000—a sum six times greater than their cost. Every mile of road constructed adds five times its cost to the aggregate value of the property of the country.

All this vast commerce and wealth are wholly the creations of railroads, and within the short space of twenty years. Such results are possible only in a country like our own, the market for whose staples, whether for home consumption or exportation, is within a narrow belt lying immediately on its north-eastern coast-line, and more than 1000 miles from the great seat of production. Wheat, the most valuable of our cereals, will not bear transportation over ordinary earth-roads more than 350 miles; over railroads it will bear transportation 3500 miles. These works, consequently, are the only ones that have given, or that can give, a commercial value to the products of the interior. They increase the value of these products just in ratio as the cost of transportation is reduced. But for them many of the most densely inhabited, wealthy, and prosperous portions of the country would have remained as wild and uncultivated as they were one hundred years ago. But for them, our commerce, considered in reference to its vast magnitude, would hardly have had an existence. They lie at the foundation of, and sustain all the varied interests of the country.—*Exchange*.

RAILWAY PASSENGER TRAFFIC.—There are sixteen railways in Great Britain, each of which carried more than five million of passengers in the year 1869. The Manchester, Sheffield & Lincolnshire line carried 6,991,371; the North British, 8,507,171; the Great Northern, 8,733,764; the Caledonian, 9,226,684; the North-eastern, 11,944,315; the Great Eastern, 13,008,907; the South-western, 13,143,453; the Chatham, 13,963,882; the Midland, 15,567,454; the Brighton, 16,560,431; the South-eastern, 19,157,205; the North London, 20,620,750; the Lancashire & Yorkshire, 22,643,002; the Great Western, 23,103,406; the London & North-western, 28,758,886; and the Metropolitan (including the District, St. John's Wood, and half the Hammersmith), no less than 36,893,791. These numbers are below the actual ones, as they do not include the holders of season or periodical tickets; the number of journeys taken by these persons is not known, but it has been estimated at about 350 each. The Great Eastern had, in the year 1869, 4,899 holders of such tickets; the Great Northern, 8,261; the Great Western, 4,300; the Lancashire & Yorkshire, 8,487; the London & North-western, 11,299; the South-western, 8,651; the Chatham, 8,568; the Sheffield, 1,814; the North-eastern, 4,928; the Caledonian, 6,671; the North British, 6,918.

Allowing there to be 11,744,664 quarter sections of land (of 160 acres to each quarter section) in the United States, and supposing each quarter section capable of subsisting only 20 persons, there would be means of support for 234,893,280 human beings, approaching near to the estimated number of inhabitants at present in China.

The Value of Low Railway Fares.

In the report of the Massachusetts Railway Commissioners, after adverting to the increase of fares and freights upon the railways of the State since 1860, they say:

As a contrast to this policy, and to lend force to the criticisms they propose to make upon it, the commissioners wish here to call attention to the results of a different course pursued elsewhere during almost the same period. The Belgian railway system now aggregates 1,703 miles in a territory of 11,403 square miles of area, being a mile of railroad to each 2,900 souls in its population and to each 6.69 square miles of territory. Massachusetts has 1,491 miles in a territory of 7,800 square miles of area, being a mile of railroad to each 971 souls in its population, and to each 5.23 square miles of territory. Both are manufacturing communities, and though the population of Massachusetts is less dense than that of Belgium, it is far more disposed to move from place to place. So much is this the case, that in spite of the reduced rates in use in Belgium, and the more than two-fold population there, in 1868 its railway system carried only 23,607 passengers for each mile of road as against 19,700 per mile for the same year on the Massachusetts roads. In regard to freight, however, the case is different. The Belgian roads in 1866, transported 12,211 tons per mile of road, while the Massachusetts roads transported only 4,948. There are, therefore, no fundamental differences as regards physical or economical or industrial conditions, which should cause the experience of the one community to be wholly inapplicable to the other.

In 1856, in spite of a considerable increase in the miles of railroads worked, the freight movement of the Belgian roads was found to have seriously decreased. Instead of making good the deficiency in receipts by increased rates on existing business, the administration met the emergency by accepting all traffic that offered at greatly reduced special rates. This policy succeeded so well that in 1872 the principle was adopted as regards minerals and raw materials of a regular low scale of charges, with a reduction according to distance. This resulted in the following year in an increase of 72 per cent. in the tonnage of this class of goods.

In 1862 the principle was extended to goods of the next class with similar results. In 1864, freights were re-classified, and the new principle applied to all except the first class, or small parcels, which in this country are known as express matter. The result was summed up by the Minister of Public Works as follows: In eight years, between 1856-64, the charges on goods have been lowered, on an average, by 28 per cent.; the public have sent 2,706,000 tons more goods, while they actually saved more than \$1,000,000 on the cost of carriage, and the public treasury has earned an increased net profit of \$1,150,000. A further reduction, made subsequently to this statement, in 1864, exceeded even these results, and under it the tonnage rose from 4,479,000 tons in 1863, to 6,533,000 in 1864.

In 1865, the government, encouraged by these results, turned its attention to fares, now applying to them the principles before applied to freights. A general scale was adopted, in which the charge per mile was diminished in proportion to the length of the journey over 22 miles. For distances less than 22 miles the old rates were retained, varying between 1.2 and 2.5 cents per mile according to the class of carriage. Above the 22 miles the rates rapidly decreased until the fares for dis-

tances over 155 miles were as low as one cent per mile for first class, and seven mills per mile for second class tickets. Under this system the fare from Boston to Albany, for instance, would be respectively \$2, \$1.40 and \$1, according as it was paid for a first, second or third class ticket. The effect of this change was a singular and very striking illustration of the immediate influence of any reduction of rates on the volume of travel. The traffic within distances of 22 miles, on which no reduction was made, scarcely increased at all. Between 22 and 46 miles, on which distances the reduction was small, it increased only 20 per cent., while on distances over 46 miles, on which a heavy reduction was made, it nearly doubled.—*Am. R'y Times*.

Narrow Gauge in Colorado.**THE DENVER AND RIO GRANDE RAILWAY.**

The requirements of the route laid down for the D. and R. G. R. are essentially and especially for a narrow gauge track. Whilst a wide gauge might be built and operated from Denver to the Ark. river, there are portions beyond over which it is hardly possible to construct or operate a wide gauge road. If a break in gauge is necessary, certainly Denver is the best place to make it. Much of its business will be with Denver. A great share of its freight will come or go no further. This will be especially the case with ores and minerals, because here, or near here, will be erected reduction and smelting works. A town to be devoted to that business will spring up somewhere on the Platte adjacent to Denver, within the next year or two. A system of railways radiating therefrom will penetrate the mountains in all directions; will bring together all the various ores, coal and fire clay, from all parts of Colorado. They must be narrow gauge, because in most places where they are required wide gauge roads can not be built. The D. and R. G. is the first line of this system. Its track will be three feet in width; others following will conform to that, and the result will be a wide network of uniform roads, co-operating together for the development of this wonderfully rich mining region with its vast and varied resources. Along the entire length of this line—850 miles to El Paso—are rich mines of gold, silver, copper and other minerals. Many of them are in situations which can never be reached by wide gauge roads, but can be by narrow ones. Each mine and each town for miles on either side, will have its branch road, all being feeders to the main line. Cars will be loaded at the mines, run down to the main track and picked up by through trains, going through to the smelting and reduction works, without reshipment, returning to the mine with coal or other freight.—*Rocky Mountain News*.

The imports into the United States in 1869, amounted in value to about \$438,000,000, of which it is estimated, \$273,000,000, or 62½ per cent. consisted of articles absolutely or practically impossible to produce in the country.

The Detroit Post thus sums up the manufacturing interests of that city: capital invested, \$10,000,000; value of annual productions, \$21,000,000; of wages to laborers and mechanics, \$6,000,000; number of employees, 9,000.

Press and Bar.

The David Dudley Field controversy has been prolonged by a fitful dropping fire. The bright affirmation of Mr. Bowles, that an attorney at law is responsible for the character of his client, was embraced by only two or three journals that were constitutionally silly, or had a particular spite at Mr. Field; but the discussion was enlarged by other journals upon the rational proposition, which no one denies, that an attorney is responsible for what he does for his client. Upon this, several journals have undertaken to make a case for the condemnation of Mr. Field. But the infirmity of this assumption of judicial duty by the press is illustrated by the *Tribune's* effort, which gave ten specific charges against Mr. Field, every one of which Mr. Field pronounces untrue. Can the *Tribune* prove them? The onus is thrown upon it. If it does not establish them, it will stand convicted of calumny.

Of course, the *Tribune* supposed that these things were so notorious that they could be assumed to be true. And it seems to hold that a public journal may pronounce and execute judgment against an individual upon common report. Thus newspapers may first make the reports and then pronounce judgment upon them.

The selection of an attorney for the managers of the Erie Railroad as the exclusive object of this moral office of the press, gives it an air of insincerity, not to say cowardice. In what is the Erie management worse than the Vanderbilt management? Has Gould increased the Erie stock without consideration? His is but a squirt to Vanderbilt's water main. Has he robbed the stockholders of dividends who had none before he came in? Vanderbilt at one stroke robbed the people of the dividends on 28 millions of stock, created without consideration, and made a perpetual charge upon them. And this is but the beginning of his levies upon the people.

It is a matter of common notoriety that the largest increase of the stock of the Erie road under Gould was made in a struggle to save it from the clutches of Vanderbilt, and that the chief avails of this issue went into Vanderbilt's pocket. Surely his defeat of Vanderbilt in this case was for the interest of the public; for it kept the Erie road out of a combination of all the great lines. And Vanderbilt has exercised as great a power in degrading the Legislature of New York as the Erie management. But the press exalts its virtue by assailing an attorney for the Erie Company, while it dares breathe no word against Vanderbilt, and its editors even assist to honor his bronze statues. There may be in all this an exaltation of the press as a great moral engine, but the point of virtue has not to us been perceptible.—*Cincinnati Daily Gazette*, March 16, 1871.

The *Technologist* says: One cord of wood cut and split fine and corded up beneath a shelter while it is yet green, will give more heat after it has become seasoned than two cords of the same kind of wood which has been continually exposed to the alternate influences of storms and sunshines.

The expenses incurred for the work of the defense of Paris are estimated at 50,000,000 francs, and the amount expended in artillery is said to be 10,000,000 francs.

It is estimated that 250,000 bales of cotton, worth \$75,000,000, will be lost this year for want of laborers to gather the crop.

— The work on the Northern Pacific Railroad has not been retarded by the winter. Recently the bridge across the Mississippi at Brainard was completed, and a train of cars crossed it containing a number of officers of the road. This bridge is 113 miles west of Lake Superior, and the road is graded nearly to the Red river, 150 miles further. A mile or two of track is laid daily, so that one can begin to calculate when the great work will be completed to the Pacific.

TRAMWAYS.—Mr. E. E. Allen, Pelham-place, Brompton, proposes to form the rail of a Z shape, so as to be reversible, either in one piece or two angle irons thickened at the angles. When these angles are large, so as to rest on the ballast without sleepers, he serrates or roughens so much of the horizontal portion of the angles as lies beyond the thickened edges upon which the wheels run. The groove for flanges of wheels is formed by a light angle iron attached to the timber or other sleeper or lower angle rail. On steep inclines he employs an additional rail in the center of the track, the upper surface of which may be level with the road.—*London Mining Journal*.

THE EAST RIVER BRIDGE.—The Brooklyn caisson of the East river bridge is almost completed. The interior is nearly filled with stone and concrete, making it now one solid mass of masonry inside. The work outside is progressing rapidly, huge blocks of granite being laid one over the other in a most substantial manner. The work on the New York side began some time since, and is progressing as rapidly as possible under the circumstances. The caisson is being built at Hunter's Point, and will be floated into its place, near Roosevelt street ferry, as soon as spring opens.

FLOATING MAIL BAGS OF ZINC.—Eight hundred letters, says the *Paris Rappel*, have lately reached Paris from the provinces, by a singular means of transport. The carriage which brought them was a zinc ball, twenty-five centimetres in diameter, and the rail on which it ran was the current of the Seine. It had occurred to M. Steenackers to fill two hollow hemispheres with letters and then solder the two together. These hemispheres had little wings like those of a mill wheel. The weight was calculated so that this ball thrown into the Seine moved at a certain depth below the surface. The current striking the wings made it progress rapidly. The postal administration in Paris was informed of the plan, and had the balls sent by M. Steenackers fished up at a water gate contrived on purpose.

MOVABLE AXLES.—The Russian government has given orders to construct a number of railway carriages with movable axles. These carriages will have the advantage of fitting the broad gauge of their own rails as the narrow one adopted in the rest of Europe. In other words, while foreign troops can not be sent to Russia in foreign railway conveyances, the Russians will be able to enter foreign territory in their own.

It costs nearly \$2,000 a day to print the official proceedings of Congress.

The sponge trade of Florida is becoming an important branch of industry.

During 1870, 100,000,000 bushels of coal were mined in the vicinity of Pittsburgh.

ROAN STEAMERS.—The Director General of the post offices in British India is putting the new rubber tired road steamers in that country. An apparatus which costs at the rate of seven hundred dollars per mile for its first establishment, will convey one hundred and twenty persons and fifty tons of freight, at the rate of ten miles per hour. This outfit includes four engines, and the distance daily traversed is about seventy miles. Two engines are run, and the other two are reserved to provide against accidents. For short distances, of comparatively small traffic, or for short collateral branches of iron roads, the road steamer would certainly seem to be better adapted than regular iron locomotives. The saving in equipment is very great.

On the 1st of January, 1870, there were in force in the United States, 706,328 life policies taken out in American life insurance companies. These policies assured the vast sum of \$2,062,906,163.

The total number of policies issued by the New York city life insurance companies in 1870, was 120,792, insuring the sum of \$303,906,006.

The total appropriations for 1872, made at the last session of Congress, amounted to \$163,414,681, being \$5,563,550 in excess of the appropriations for 1871.

The damage done by the bombardment of the Strasbourg Cathedral is estimated at \$300,000.

Nearly 400,000 bales of cotton have been received in Memphis since September 1st.

RECEIVER'S SALE.

Jacob T. Martz, Receiver of the Cincinnati and Mackinaw Railroad Company, plaintiff,

vs.

The Road Bed, &c., of said Railroad Company.

The State of Ohio Darke County Common Pleas, No. 3,280.

By virtue of an alias order of sale made by the Court of Common Pleas, within and for the county of Darke, and State of Ohio, at the June Term, A. D. 1868, of said Court, in the above entitled case, and to me, as Receiver, appointed by said Court, of the said Cincinnati and Mackinaw Railroad Company, issued and directed, I will sell at public outcry, at the door of the Court-house, in Greenville, in said County of Darke, on

SATURDAY, MAY 6, 1871,

at the hour of 2 o'clock, P. M., of said day, the following described property, rights, franchises, &c., of the said Cincinnati and Mackinaw Railroad Company, situate and being in the counties of Darke, Mercer, and Van Wert, in said State of Ohio, to-wit: The Road Bed and right of way of the said Cincinnati and Mackinaw Railroad Company for a railroad, commencing at a point near Greenville, in Darke County, aforesaid, and extending through the counties of Darke, Mercer, and Van Wert to the town of Van Wert, in said 1st named county, in the State of Ohio, including the bridges, fixtures, and culverts, railroad ties on the same, or intended for the said road, together with the right of way owned and held by said Company for the construction of its said road, together with all the rights and franchises of said Company for the construction of and maintaining its road in the said State of Ohio, together with all other property real and personal, belonging to said Company, in said State of Ohio, intended to be used in the construction of its said road.

Appraised at Seventeen Thousand Dollars.

Terms of Sale, Cash.

W. A. WESTON, Receiver, Cin. & Mack. R. R. Co. C. CALKINS, Attorney; March 23, 1871. 23-3-70, St.

THE RAILROAD GAZETTE, published in Chicago, by A. N. KELLOGG, is a Weekly Illustrated Journal of 24 pages, as large as those of *Every Saturday*.

It contains a complete record of railroad news:—the progress of new roads, elections and appointments of officers, contracts let and to be let, summaries of annual reports, illustrated descriptions of railroad improvements, articles both original and selected on railroad operation and civil and mechanical engineering, and discussions of the relations of railroad companies to the community.

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The Railroad Record.

E. D. MANSFIELD, - - - - - } Editors
T. WRIGHTSON, - - - - - }
A. J. HODDER, - - - - - }

CINCINNATI, - THURSDAY, MARCH 30, 1871

The Railroad Record,

PUBLISHED EVERY THURSDAY MORNING,

By Wrightson & Co.,

OFFICE—No. 167 Walnut Street.

SUBSCRIPTIONS—\$3 per annum in advance.

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The Northern Pacific Railroad Company.

ITS CERTAIN SUCCESS—AND VALUE OF LANDS.

In two former articles on this subject we specially touched upon the geography, climate and resources of the great North-west (partly in this country and partly in the British Possessions) of which this road must be the outlet, and for a long time without any competing route. Now we shall show the certainty of its success, the immense value of its property, and the value of its bonds. So unknown is this immense country which lies north of the Missouri and west of Lake Superior, that it was necessary to make clear the natural resources of that country, the mildness of its climate, and the certainty of speedy settlement, before we could show the immense value of the property intrusted to the care of this company. This we have done. Let us recapitulate some of the salient points we have made:

1. The route of the Northern Pacific will (as surveyed) be in the valley of the Missouri and on the Yellowstone for about 1,000 miles, to a low pass of the Rocky mountains (about 5,000 feet), and therefore the local traffic (which is always the great profit of railroads) must be derived chiefly from the Missouri valley, and the great region north of it and west of Superior and Winnipeg. This is directly, and in its whole extent, tributary to the Northern Pacific by the valley of Red river, through which a branch of the Northern Pacific is now constructing.

2. What is the extent and resources of that region? This region is from the 45th to the 55th degrees of latitude (about 600 miles) and 1,000 miles from east to west, making 600,000 square miles in area. The State of Ohio is 40,000 square miles. Hence, there is in this undeveloped region (without a mountain or a sand plain in it) an area equal to fifteen States like Ohio, or eleven equal to Illinois. The quality of this land is generally, as testified to by all observers, equal to what is called wheat land, that is, undulating upland well drained. It is well watered in every direction, on its western and northern sides, with abundant timber, and in places abundant coal. Such a country is equally well adapted to wheat, oats, grass, and all common vegetables.

3. What is the climate? The testimony of the officers of the U. S. Exploring Expedition, of the observations (recorded in Blodgett's Climatology) and of travelers agree, that the climate on this undulating upland is milder than it is south of it, that cattle can feed out all winter, and that, in fine, this is proved by isothermal lines to be the same climate with the best part of Europe, in Germany and Northern France, and New England. The isothermal line of the 50th degree passes through Chicago, Cleveland, Harrisburg and the wheat region of the Black sea. These facts are enough to determine beyond the shadow or a doubt that this great country will be settled up and that speedily. In all our boasts about the vast table lands of this country we have forgotten that the largest part of the good lands are taken up. But, happily, this great North-west was left untouched, because its character was not known, and people were looking to the South west. Hence, we have now this new, virgin world to go to, and to which the Northern Pacific road is to be the great pioneer, and of which it holds a large piece itself. It is, therefore, palpable, that that region will be rapidly settled, and the Northern Pacific will carry the people in this great tide of immigration.

The next question is, for how much and to what extent is the immense landed endowment of the company available?

Congress, in order to make the construction of this work perfectly certain, passed a supplemental act in 1870, giving authority to the company to take other lands, within twenty miles of the road, when lands originally granted were taken up, as they were in some instances. Thus the entire grant is made certain to the extent of the original grant. This was twenty alternate sections on each side of the road in the territories, and ten alternate sections in the States. This is 25,600 acres in the territories per mile, and 12,800 acres in the States. Besides this is granted the right of way, 200 feet on each side of the track, and ground for stations, depots, &c.; and also the right to all materials which may be necessary. The total amount of this grant is, in round

numbers, 50,000,000 acres. This is double the size of the State of Ohio, and double the size of Holland and Belgium together, and will without difficulty support eight millions of people.

In estimating what may be got for this land, allowing of course a few years for the sale of the whole, let us take only 1,000 miles, which lie between Lake Superior and the summit of the Rocky mountains. This lies four-fifths in Minnesota and Dacotah, the residue in Montana, and is unquestionable as to quality, climate and availability. About 200 miles are in Minnesota. This will be distributed in about the following proportions:

In Minnesota.....	2,560,000
" Dacotah.....	15,360,000
" Montana.....	5,120,000

These are in round numbers, but will be near the truth. The whole of this land is as available as any in the central western States, and, as we have shown heretofore, the tide of immigration must go onward rapidly in that direction. The inhabitants of Northern Europe, who are now fast tending to this, move on their own lines of climate, and are fast filling up Wisconsin and Minnesota. Now what are these lands worth? This is not difficult to tell, allowing for time and improvement. We have several clear tests. The alternate sections of the Government can not be sold under \$2.50 per acre. The Illinois Railroad had a Government grant a few years since of 2,595,000 acres, in a prairie and generally dry country. This company have sold 2,000,000 of acres of this land at an average of \$12 per acre, producing \$24,000,000. These were credit sales, on time, and the company had no difficulty in the collections. Looking to the character of soil, water, climate, &c., in central Illinois, we should think it evident that the lands of the Northern Pacific Railroad were fully equal intrinsically to those of the Illinois Central, and fully equal prospectively in value. Indeed, so good a judge as Mr. Wilson of the Central Road Land Department says they are worth more. He says, that from much information and experience, he thinks the lands of the Northern Pacific are worth 50 per cent more than those of the Illinois Central. The actual selling price of lands within what is called "the American desert," on the Kansas road, are selling for \$4 30; but these lands can not compete with those of the Northern Pacific. The school lands of northern Minnesota (within the region we have here described) sold in 1865, at \$6.30 per acre. With all these tests before us, we can not place the minimum value of the lands east of the mountains, amounting as above to 23,040,000 acres, at less than an average of \$8 per acre, making for that thousand miles, \$184,320,000. If we put the remaining 27,000,000 at the Government price on roads of \$2 50 per acre, it will amount to \$67,500,000. The aggregate money value of the land grant to the Northern Pacific Railroad Company

will, therefore be \$251,820,000. Any rational examination of the land grant to the Northern Pacific, the quality of the soil, the climate, the character of the people who are going to this region, and the sales of similar qualities of land, will lead to the conclusion we have just expressed, that the magnificent endowment of the Northern Pacific is worth at least *two hundred and fifty millions of dollars*. The construction of the Northern Pacific is therefore a certainty, so far as money or foresight can determine it.

Let us look a little now at its state and prospects. We see that 188 miles, which we believe is the section immediately west of Lake Superior, is nearly or quite completed. The Red river branch, which goes to Pembina (and doubtless will be completed to Fort Garry in time), is to be finished this summer. Thus the Northern Pacific is not just beginning in a wilderness, to go through barren lands, but it is already pushing on through fertile lands, good climate, with the work well under way, and settlements fast following its track. But yesterday almost, scarcely a white settler dare remain in Dacotah. Today, they are going in by thousands. The following is the 1870 census of the territories through which the Northern Pacific Railroad passes:

Minnesota.....	460,037
Dacotah.....	11,836
Montana.....	20,594
Idaho.....	14,836
Washington.....	23,271

Here are 530,000 people on the route of the Northern Pacific road. The following is the progress of population in that space in twenty years:

In 1850.....	6,077
" 1860.....	174,699
" 1870.....	530,574

It is very evident that this country will have (allowing for the diminution of the ratio) full 1,200,000 inhabitants in 1880, probably more. In the mean time, the Canadian Government has been awakened to the need of opening up communication with the great central region, west of Lake Winnipeg and in the valley of the Saskatchewan. We have said in previous articles, and we repeat, that the tide of immigration, which is recently setting in towards Kansas, West Missouri and Nebraska, must by sheer necessity be soon deflected to the north-west. When we reach the center of Kansas, and have gone one-third of the way into Nebraska, we have exhausted the lands, which can be cultivated without irrigation, or where fuel can be cheaply obtained. The farmers who are going from the middle and central west States will not undertake the additional expense of labor and capital required for irrigation and the transportation of fuel. They will go where good lands, well watered, with abundant fuel, can be had. It is probable that the relative increase of Minnesota, Dacotah and Montana will be

equal to that which poured into Ohio and Indiana, at least so long as the good lands last, and that will be till long after the Northern Pacific Railroad is finished and become the great artery of central North America.

Scarcely anybody, even the most intelligent people, have even a faint idea of the grand progress of railroads in this country, or of the effect they are producing on the migration of people. Since 1860 (which comprehends the period of our tremendous war) we have made 23,000 miles of railroad! It has added immensely to our wealth, and is carrying the tide of population over our western plains.

How New York is Going to Do it, and How Cincinnati Must Do It.

For some years New York has felt the want of a method of quick transit from one extreme of the city to the other.

To meet this demand all sorts of plans have been proposed, but no one of these meet with anything like general approval. None of the means tested and approved in the large European cities seems to satisfy the Gothamites. They must have a way of their own. It is for this reason, we suppose, that the last suggestion is that of a viaduct railway (the proposition of one Mr. Genet) attracts more attention than any other.

As we understand it, the roadway is to start near the City Hall and run to Bleecker street, between Center and the Bowery, from this point branches are to be made to the east and west sides of the city, between Third avenue and the East river on one side, and parallel with Seventh avenue on the other side. There are to be four separate tracks, so as to accommodate slow and fast trains.

It is estimated that this work will cost one hundred millions of dollars, and will require about five years to complete.

To accommodate this roadway it will be necessary to cut right through solid blocks of buildings a track of at least forty feet in width, in many instances destroying them entirely for the uses they are now put to. Upon this space are to be erected solid granite pillars, fifteen or twenty feet high, or an earth embankment of this height is to be made, so as to bridge all the cross streets high enough to admit the passage of the present street cars or other vehicles. In this embankment, or between these huge granite columns, are to be stores and rooms beautifully fitted up, and upon each side of this great roadway are to be elegant boulevards and promenades.

This is a stupendous undertaking, and yet it is all quite feasible; and as something of the kind is an absolute necessity, this or an equally extensive and grand scheme will some day be accomplished.

Just what is going on in New York, is to a modified extent moving in all our large cities. The question of quick transit from extreme points of our cities to their business centers,

and from their suburban towns to the same localities, are questions in daily agitation, and so they will continue until they are solved by the supply of this growing demand.

To apply this matter to ourselves—to the city of Cincinnati. Let us ask what are we doing? This is a pretty difficult question to answer. There is considerable talk in our midst about it, but it is without the force of organization or a settled purpose.

There is probably no city in the country whose prosperity would be advanced as much by quick and certain transit, between its suburbs and center, as Cincinnati. Located upon a semi-circular space of about twenty-three hundred acres, it is the most densely populated city in the country, and what is worse there is no possible way for it to expand, except upon the beautiful plain, that stretches northward from the top of Walnut Hills. Already our people are building extensively upon the hill sides, and are settled in good sized villages upon their summits, and are filling the narrow space from the hill slope to the river, and are following Mill creek and the Little Miami bottoms far into the country; and thousands find their homes in an adjoining State.

Our city *must grow upon the upper plain* of Walnut Hills, if it is to grow at all, and one of the most powerful auxiliaries to this growth would be a rapid and certain means of transit from the lower to this upper section of it. Without some such means as this we can hardly see how this growth and consequent development are to be brought about.

For the occupants of the slopes and the immediate tops of these hills, it is likely railways of the narrow gauge or Festiniog pattern will be constructed. They are practical for such a traffic, and can be built to suit localities, as they curve about, and rise upon grades that in ordinary railways are impracticable. Indeed, we learn that just such a scheme is now seriously under consideration by the denizens of College Hill and vicinity, and we hope it will be successful.

But the principal relief must come from railway lines that shall pass through the hills, and ramify through the plain beyond to meet the demands of the trade. This is no extraordinary work. It is not comparable with what is proposed in New York and other cities of America, or with what has been done in European cities for such relief.

The partially made tunnel from Deer creek through the Walnut range illustrates what we mean, and proves the ease and practicability of the undertaking. If this work was carried through, as it most assuredly ought to be, it would be 9,990 feet long, a distance that can be safely and easily passed over by rail in the space of four minutes, and *without crossing a single street or alley*, a matter of no small importance. At the termination of this four minute run opens out one of the most beautiful parts of the whole Miami valley, that with

such a means of rapid, certain, cheap and frequent transit, would become densely populated for many miles around. It would become part of our city, and though separated from it by a range of hills three hundred feet high, would be nearer to its business centers than some parts of the twenty-three hundred acres within the lower plain.

From the northern terminus of this tunnel would extend lines of street railroads, as the city would extend upon this upper plain bringing a business to this channel of communication with the lower city, that would tax its utmost capacity, and make this now neglected property altogether the most valuable within our corporate limits.

In the course of time other channels would be cut through these hills, meeting local wants, until, as an eloquent and experienced gentleman recently remarked in a public argument upon this subject, "there would be three tunnels through the Walnut Hills instead of one, and all would be fully engaged in the immense traffic that the people of this city would do among themselves."

This is a subject of great importance to us, quite as much so as it is with the people of the city of New York, for whose accommodation it is proposed to spend one hundred millions of dollars. And it would be well if our thinking men, and moneyed men, and city managers, would anticipate the future a little, and thus save millions of money and facilitate our city's prosperity.

"The Eternal Fitness of Things."

"The right man in the right place," is a trite old maxim, and every one of any experience in the world knows that without the right man in the right place, things are very likely to go wrong. And yet how rarely is this rule observed by us, even in matters of the greatest importance? We are so prone to allow direct influences to swerve us from our better judgment that we are constantly committing errors in these particulars, that bring upon us the very calamities we seek to avoid.

In no respect do we make these mistakes, or allow these influences to interfere with us so much, as in the management of our railway corporations. We act as though we thought that because it is a great corporation to be managed, the common principle of "the right man in the right place," that we observe and insist upon in less important matters, can be ignored with impunity. There never was a greater mistake, as we think the history of nearly every railroad built in this country proves. It is difficult to tell how many of the misfortunes that have befallen these great enterprises can be attributed to the neglect of this important rule, but we are safe, however, in saying that much the larger number of them might have been avoided, if competent men had been their managers.

What else can be expected than blunders and frauds, where there are such innumerable opportunities for their commission as the extensive and complicated affairs of a railway corporation affords, when men are at the head who are the merest tyros in the business they profess to manage, or disqualified for such a position, by both culture and natural capacity? Suppose that a disqualified man was at the head of a large jobbing house, or retail store, or manufactory, would not every sensible man who knew it be sure that such jobbing house, store, or manufactory, would not prosper, or would most likely fail? Qualification, that is, an intelligent understanding of the business engaged in, together with natural aptitudes for it, are the requisites for success, and are imperatively demanded in everything we engage in, except politics and railroading. These are made the sport and prey of adventurers, empirics and demagogues.

Because men have been successful bankers or lawyers, or mercantile operators, it does not follow that they are fit for railway managers. Success in these avocations are good commendations. Such men usually possess that activity, comprehension and keenness of intellect that capacitate them to win in most any business they may engage in, but as railroading has become a profession, and that, too, of a high and complicated order, and that to excel in requires the entire occupation of the best of brains, it must be learned, like any other profession, by close application, devotion, and years of practical experience. There is no "royal road" to knowledge in this profession, any more than there is to any other, and therefore to jump, so to speak, from the business of a life, into this, and expect to be successful, is to trust more to luck than to the logical results of experience and good sense.

The best managed railroads in America are those presided over by railroad men, who have for many years at least made railroading their business, and who have become proficient therein. The Pennsylvania Central and Baltimore & Ohio companies are examples of this intelligent and experienced direction. The results are known to the world.

When railroad stockholders understand this matter better, or observe it more closely than they have hitherto done, they will not allow all sorts of dead weights to be cast upon the broad corporate shoulders, but will understand that though they *seem* to load down others, it is only *seems*, as it finally falls upon *all* in proportion to their individual interest. Then, and not until then, will railroads rise to their highest possible standard and produce results that their projectors have long claimed ought to flow from them.

Some things can be done as well as others. But some men can not do these things as well as others. To insure success, the "right man must be in the right place."

Are Railroad Bonds a Good Investment?

We unhesitatingly answer this oft-repeated question by saying that *first* mortgage railroad bonds have proved to be among the very best securities that are offered in our money markets, because they are perfectly safe, and pay a good rate of interest.

If we consider the vast amount of such securities that have been floated, we venture the assertion that (aside from the national bonds) they have yielded larger returns, with less loss of either principal or interest, than any other investments made by our people, whether they consider bank stocks, gas stocks, insurance or manufacturing investments, or the common favorites, note and mortgage upon realty.

Remember, we say *first* mortgage bonds, because there have been floods of mortgage bonds sent out among our people, most of which are as valueless as much of the first issue of stocks of our railroads. These were second and third mortgage bonds, or income bonds, or deferred bonds, or some security that was subordinate to the first mortgage lien, and that was placed upon the market when the companies issuing them were pressed for means, and sold at speculative prices, and used to gamble with in the money market, instead of being held as permanent investments.

Such securities have no market now. They would probably not even command what we have denominated speculative prices, because their legal status is known, and experience proves that they are liable to reverse the rule that governs the first lien, and grow worse as the road they are upon grows better.

What the test of time has demonstrated in this matter in America, it has done in Europe. There, such securities as we call first mortgage have sustained the highest reputation, so that any new railway of merit finds little or no difficulty in capitalizing its first debentures at good prices.

This, probably, to most of our readers, would be sufficient proof of the accuracy of our answer to the question that heads this article. This is the proof of experience, or of thorough and continued trial, and worth all, and more convincing than all, the theorizing that could be advanced.

But it is interesting to consider this subject somewhat in detail. Whilst experience has proven that first railway bonds are safe and profitable, it has also taught us why they are so, and why they are safer upon some roads than upon others, and why the exceptional cases to this general principle have occurred.

In the first place a railroad *must* have a good local traffic, as this business is certain, and can not very well be taken from it by competing lines. Or else it must hold so commanding a position between two important commercial centers, or in the great thoroughfare of the country's carrying trade that it can

not be superseded by "cut offs," or shorter and better and cheaper routes.

Most all our railroads develop a local business greater than is anticipated before they are made, and if this trade was carefully nourished it is probable that every mile of railroad made in the country could be brought to the paying point, upon a legitimate cost.

This is the vital principle that underlies the safety of railroad bonds. The road must earn the money, or it can not pay its obligations, and it will not be likely to gather these earnings if the country through which it passes, or the connections it makes, can not supply the business. This is its debt paying capacity, and therefore of the first consideration to creditors.

The next question of importance is the perpetuity of this capacity.

Now, mortgages upon real estate, particularly if improved, rather deteriorate in value than otherwise, by the depreciation of buildings, &c., or, for many reasons the property may become less desirable, and therefore less valuable. But a railroad grows better with time. It makes its business, effects connections with other roads, improves its facilities for traffic, becomes an established thing in the country, to which all other interests accommodate themselves. It therefore improves as a security for its bonds, as well as in its capabilities to meet their coupons regularly, and to pay the principal sum when due.

Indeed, examine this question as we may, we shall reach the conclusion that first mortgage railroad bonds are about the most desirable investments that our people can place their surplus capital in.

Ohio & Mississippi Railroad.

DIRECTORS' MEETING—ANNUAL REPORT OF 1870
—CHANGE IN THE DIRECTORY.

The directors of this company met at their room on Fourth street, on the 22d inst, for the purpose of considering the question of changing the gauge of the road from six feet to that of four feet nine inches.

Two directors made vacancies in the board by resignation, which were filled by the election of Daniel Torrence, of New York, as representing the New York Central road, and John King, Jr., of Baltimore, in behalf of the Baltimore & Ohio road.

The directors matured measures to at once change the gauge as proposed, and directed a sufficient force upon the work to complete it by the 1st of August next.

Forty new locomotives are ordered to be built. Ten old engines are to be at once changed for the new track, and three hundred new freight cars are to be built as quickly as possible, and such other improvements are to be made upon the road as will place it up to the highest standard of efficiency and convenience for both freight and travel.

The president of the road made an elaborate report upon the earnings and expenses of the road for 1870, as well as much other interesting and valuable matter concerning the company.

We condense from this report the following exhibit:

EARNINGS.			
	1870.	1869.	1868.
Passengers.....	\$1,213,137 55	\$1,192,030 03	\$1,230,931 92
Freight.....	1,789,130 55	1,507,407 67	1,536,818 95
Exp. and mail..	155,859 94	156,019 77	146,239 79
Total.....	\$3,158,137 05	\$2,915,547 47	\$2,904,049 65

This is a very handsome advance in business, and augurs well for the future.

This increase is in part to be attributed to the business of what is known as the Louisville division, which was opened for trade on the 1st of April, 1870, and for the first nine months of its operation yielded the sum of \$89,863 32, and gave to the main line business that produced the sum of \$145,216 48.

The aggregate expenses paid by the company during the year amounted to \$3,151,368 46, which includes the following items:

Maintenance of way and structure	\$609,173 14
Motive power and cars.....	374,785 12
Transportation.....	954,847 16
Damages to property and passengers	34,860 02
Interest on bonds.....	443,676 92
Interest on preferred stock	295,276 56

During this period \$382,000 of mortgage bonds and \$310,875 of preferred stock were sold at good rates.

The following is an exhibit of the funded debt of the company:

Old bonds of all classes, exchangeable for new consolidated bonds	\$3,672,000
Consolidated bonds	2,862,850

Total bonds.....	\$6,534,850
The total preferred stock.....	\$4,030,000
Total common stock.....	20,196,614

Total stock.....\$24,226,654

Upon the 1st day of January, 1870, the company had on hand, cash, \$110,357.

The cost of the Louisville division, up to January 1, 1870, was \$1,822,289.

The company used during the year, 87 engines, five of which are wood burners.

They own 1,448 cars

The number of passengers carried during the year, between Cincinnati and St. Louis, was 384,305.

The number of tons of freight carried during the year was 664,476.

The gross earnings of the line between Cincinnati and St. Louis, for 1870, was \$3,188,137. When we consider that in the year 1858 the receipts upon the same line were only \$1,473,310, it shows a steady and satisfactory advance.

On the whole this is the most interesting report of this company that has ever been issued. It shows that the road has a certain and prosperous traffic, and that under good management, and with the new gauge, it must rise to a first-class standard.

The Asiatic & European Railway Line.

There exists but one natural depression across the North American continent. *It is fortunate for the Northern Pacific Railroad that it is located in this great trough*; unfortunate for other transcontinental enterprises that they can find no similar advantage in other latitudes.

A local value and advantage, in the nick of time, caused California and San Francisco to become the objective points of the Union and Central Pacific Railroads, and it is as well that events happened as they did. We can now safely adopt the proper route, the Northern, the more southerly one being completed. Had the Northern been built first, it is doubtful when, if ever, the Omaha and San Francisco route would have been constructed.

From the time of Lewis and Clark down to Whitney and Stevens, the wisest heads have urged the Upper Missouri and Yellowstone route, for reasons now obvious, but which then failed to attract the attention they deserved. Whitney, about 1844, and for several years both before and after, besought Congress and public men to listen to his project, but without avail. He died without seeing the hope of his heart accomplished. The report of Gov. Stevens, of Oregon, is understood to have been partially suppressed, as it was in favor of a route too far north to suit the then Secretary of War, from Mississippi, who had official charge of the reconnaissance.

While the Union and Central Pacific Railroads cross *the hump of the continent*, climbing over four successive ranges—the Rocky, 8,235 feet; the Wasatch, 7,463 feet; the Humboldt, 6,169 feet; and the Sierra Nevada, 7,042 feet—the natural configuration of the land at the point traversed by the Northern Pacific Railroad presents but one range, the Rocky, having an elevation at this point of about 5,000 feet. How is this? The Rocky mountain range trends to the north-west, and is reached by the Northern Railroad at a point 500 miles west of the meridian where the Union Pacific strikes it. While the Union road is traversing the elevated desert from Cheyenne to the Wasatch, embracing two grand summits, the Northern route is pursuing the valley of the Yellowstone, at an elevation more than 3,000 feet below the level of the Union road. After crossing the Rocky, the Northern road reaches the waters of the Columbia river, and pursues an easy grade to the Pacific, while the more southerly road has yet two grand summits to cross, the Humboldt and the Nevada.

Nature has only hewed one grand gap in the Sierra Nevada, that traversed by the Columbia river. There is only one such chance; fortunately for the world it is in the right place. Situated further south it would have injuriously deflected the highway.

Let us accept the situation.

EDWARD H. KNIGHT.

The Atlantic & Great Western Railroad to be reorganized and fixed up in tip top style.

The last mail from Europe brings the news that at a recent conference in England of the parties interested in the Atlantic & Great Western Railroad, it was determined to reorganize the company upon a proper basis, and place the road in a first-class condition. To do this, two millions of dollars were at once provided for, which is to be disposed of under the trust of Gen. McClellan, Senator Thurman and W. B. Duncan.

"It is proposed to issue £400,000 convertible 7 per cent stock at the price of 75, to meet the payments that will be necessary in order to confirm the acts of foreclosure by which the entire property is to be brought back to the control of its proprietors. Only £20 of the £75 is to be paid up in the first instance, and this £20 will be returned on or before the 1st of September next, if the reorganization of the company shall not then have been established. Should the balance be called up, interest will date from the 1st of March, and the stock will be redeemable at par within three years (thus giving a bonus of 25 per cent), or convertible at the option of the holders into 7 per cent first mortgage bonds of the reorganized company at the price of 80. At the same time it is stated to be probable that only part of the balance of the subscription price will be called up, and in that case the allotment of each £100 will be reduced only to the extent of the sum not required, so that, for instance, in addition to the £20 first called only £20 more be called, the holder of the allotment on which £40 in all had thus been paid would receive a definite certificate for £65, the extra £25 representing the bonus that would accrue from the paying off of the whole bond at par, and which is to attach to it in any case. The trustees of the reorganized company are to be Gen. McClellan, Hon. A. G. Thurman and Mr. W. B. Duncan, and applications for the stock are to be addressed to Messrs. Bischoffsheim & Goldschmidt. A circular from the president of the company which accompanies the prospectus, describing the position and resources of the undertaking, states, in confirmation of the views originally expressed, that 'since the opening of the line, notwithstanding the financial difficulties into which it was immediately plunged, the traffic has gone on increasing 300,000 tons annually.' It is understood that the litigation with the Erie company has been concluded in a satisfactory manner, that the harmonious working of the two companies has been provided for, and that the only obstacle to the immediate return of the property to the proprietors is the claim of the Dutch bondholders, which will be removed by the payment of their coupons, the money for which is to be provided by the stock issue now proposed. * * * The applications for the £400,000 reorganization stock of the Atlantic & Great Western Railway already exceed that amount, and the subscription list, therefore, will be closed on Thursday, at noon, for London, and on Friday for the country."

— Pennsylvania in the last ten years gained more in population than any other State in the Union except Illinois. The latter gained 800,000; the former 600,000, and more. What is remarkable in the case of Pennsylvania is that every county in the State made a gain.

North and South Railways.

For many years we have maintained that North and South thoroughfares were essential to the true unity of the country, and that the time would come when they would do a most extensive and profitable business. The results of the war are hastening our anticipations, and the following interesting letter from General Rosecrans shows that he has become an ardent advocate for such lines of communication.

THEY ARE ESSENTIAL TO THE UNITY OF A GREAT NATION—OUR STATESMEN SHOULD USE EVERY LEGITIMATE MEANS TO MULTIPLY THEM.

That immense stream of immigration which, for the last three centuries, the Old World has been pouring into the new, fills thoughtful minds, with ever increasing wonder, presenting new phases of human life and new social and political combinations of the highest interest and significance.

The history of civilization in the past has been mainly that of the inhabitants of the borders of navigable waters. The incentives to industry and emulation furnished by those means of easy intercourse and commerce seem to have been necessary to elevate men from the savage state.

Polished urbane manners appear to have come only from the attrition of individuals, due to the close contact of the *polis-urbs*—city.

But railways, like navigable waters, are *iron rivers* affording more easy and rapid means of commercial and social intercourse than even rivers, lakes, and oceans.

The electric telegraph is a vaster element of interchanging thoughts than the most intimate city life. It brings into communication the minds of inhabitants of distant continents, to-day, more nearly than were those of inhabitants of neighboring towns one hundred years ago.

Yet, notwithstanding the introduction of these new elements, and the wonderful results they must produce in modern civilization, the fundamental principles of its development are unchanged and unchanging. We still live under the dominion of *inexorable law*.

As of old, man continues to be molded by the forces of nature, and surrounding circumstances. As of old, climate, topography, soil, food, and other conditions, control individual, social, and political developments. As formerly, like external conditions give rise to similar customs and institutions, and unlike produce diversity. Now, as formerly, populations surrounded by unchanging external circumstances crystallize and become immovable. And they spread more readily on east and west than on north and south lines—on isothermal parallels than on meridians; because less change of habit and life are required in moving on the former than on the latter. Inhabitants of the same parallels of latitude will more readily live under the same political institutions than those dwelling on the same north and south lines, which require other bonds of unity. So railways will more naturally be built on easterly and westerly than on northerly and southerly lines; and the habits and tastes of those who live along any one of these east and west lines will gradually assimilate, while those of the people on the banks of the adjoining *iron river* to the north or south will be different.

Under the operation of these principles our country would gradually become divided into great easterly and westerly belts of population, differing in character, habits, etc.

Our own national experience proves this to demonstration. We have many eastward and westward, but few north and south lines, and the ideas, tastes, and habits of the people are more alike on the east and west than on north and south lines, though having the same origin.

But north and south lines are the *necessary* bonds to unite the great east and west belts of differing population. And, since the operation of natural causes does not so readily produce them, that unity which our common Government and aspiring civilization demand must be secured by wise statesmanship providing *North and South railways*.

Does not our own experience demonstrate this necessity? What but comparative non-intercourse between the great body of the people North and South made possible the rebellion? Had the people of the two sections been accustomed to travel and traffic on north and south lines of railway at short intervals apart, could even the *virus* of slavery have brought upon us the gigantic war which slaughtered more than half a million of our bravest and best, and loaded us with debt and taxation?

Does anybody believe we would now be one nation, did not the great Mississippi bind together the people of the West and South even as lakes and climate clasp them to the East by lines of commerce and travel?

Not legislators for the nation, and leaders of political parties. Expedients to court popularity are *shams*—principles alone will endure and govern. If, then, you desire the unity of this nation—if you yearn and are willing to labor for a newer and higher civilization—multiply your *North and South lines of railway*.

This is a "higher law" which neither section nor party, statesman nor political organization, can disregard with impunity.

Obedience to that law now demands from Congress needful legislation:

1. In favor of the Cincinnati Southern Railway, the construction of which in 1856 would have prevented or greatly shortened the war of the rebellion, and will soon end Ku-Klux by filling that region with a thriving population.
2. In favor of the other north and south lines in Louisiana and Texas.
3. The extension of that great national route, the Kansas and Pacific, seven hundred miles southward down the Rio Grande to El Paso.
4. The Denver City road southward and northward.
5. The Pacific Coast road from San Diego to San Francisco.

Let it never be forgotten that north and south roads are relatively of the greatest national importance—some of them indispensable to national unity; and that wise statesmanship, rather than natural causes, must be relied upon to insure their construction.

—Chronicle. W. S. ROSECRANS.

— John T. Wilson, formerly of Aurora, Ill., and Ass't Master Mechanic on the Union Pacific, has accepted a similar position on the Central Pacific at Carlin, Nev.

— About \$15,000,000 worth of artificial flowers are used annually in America. They are chiefly made in France.

Newport Water Works.

AN ACT to authorize the city of Newport to supply itself and others with pure water and to establish water works.

SECTION 1. Be it enacted by the General Assembly of the Commonwealth of Kentucky, That the city of Newport, in the county of Campbell, is hereby authorized to supply itself and such neighboring towns, cities, communities and individuals, whether in or out of this State, as may contract therefor, with pure water from the Ohio river. And for the purposes of this act may establish works at any point on the said river within the county of Campbell, such supply and distributing reservoirs as may be deemed necessary, and build and lay all necessary aqueducts and conduit pipes, and purchase or condemn lands, ways and materials for the said works, reservoirs, aqueducts and pipes, and the construction thereof, and for all necessary appendages thereto.

SEC. 2. That upon the application of the city council of the city of Newport to the county court of Campbell county, the said court shall appoint three commissioners, two of whom shall be residents of said county outside of the city limits, and the other an engineer of said city, who shall be sworn faithfully to discharge their duties under this act to the best of their skill and judgment, and whenever said city shall be unable from any cause to agree with the owner of any land or material required for the site or construction of the said works, reservoirs, aqueducts, bridges or conduits, or other appendages, it shall be the duty of said commissioners to view the land or material required, and to fix the amount of compensation to which the owner or owners may be entitled, and to make out and return to the office of the clerk of the county court a report in writing, particularly describing the land or material valued, and the interest or duration of interest valued, and the amount of damages assessed; the said report shall give the name of the owner and state whether such owner is a resident of the county, and whether a married woman, infant or person of unsound mind. The clerk shall file the report, endorsing thereon the time of its being filed, and if the owner resides in the county he shall forthwith issue a summons commanding the owner to appear and show cause why said report should not be confirmed, which summons shall be forthwith executed by the sheriff or other officer to whom it may be delivered. The report shall stand for hearing at any term of the county court commencing not less than ten days after the execution of the summons. If the owner is not a resident of the county, the court, at the first term after the report shall have been filed, shall appoint an attorney to defend for such owner, who may file exceptions at any time not later than the next term, and upon exceptions being filed by the owner or by an attorney to defend for him, or by the city of Newport, the court shall, unless upon questions of law arising upon their face the said exceptions be overruled, order a jury to be empaneled forthwith to try the facts in issue, unless for good cause shown the trial shall be continued. If no exceptions be filed, the report shall be confirmed, and upon the confirmation of the report, or the verdict of the jury in case of exception, this court shall render judgment condemning the land or materials, and upon tendering the amount assessed, in either case, to the owner or into court, the city shall be awarded a writ of possession, to issue forthwith: *Provided*, That in all cases an appeal

shall lie from the judgment of the county court to the circuit court within sixty days, and from thence to the court of appeals, but no such appeal to the circuit court shall suspend the execution of any writ of possession: *Provided*, That nothing herein shall exempt said city from being compelled to comply with the judgment of the court of appeals, and to perform the judgment of the circuit court thereunder.

SEC. 3. That for the purpose of raising money to construct the said water works, reservoirs, aqueducts, conduits, and necessary appendages, the city council of the city of Newport is authorized to issue the bonds of the city to an amount not exceeding three hundred thousand dollars, payable not more than thirty years after date, with semi-annual interest coupons attached for a rate of interest not exceeding eight per centum per annum, and to sell and dispose of the same and receive the proceeds thereof. The said bonds and the coupons attached shall be a lien upon all the real and personal estate liable to taxation in the city of Newport to the extent of the annual taxes thereon for this purpose, and upon all the property of every description purchased, condemned, constructed or used by the city for the purpose of supplying pure water as aforesaid, which liens shall have precedence except as to State taxes.

SEC. 4. The city council shall, by ordinance, provide for the form of the said bonds and the manner of their attestation, and where they and the coupons shall be made payable, and in the same ordinance shall levy an annual tax upon all the taxable property of the city to pay the several instalments of interest and to provide for a sinking fund to redeem the principal at maturity, or any part or the whole thereof before maturity: *Provided*, That this section and the preceding one, together with the said ordinance, shall be printed or engraved on the back of each of the bonds to be issued in pursuance of this act.

SEC. 5. The fund hereby authorized to be raised shall be a separate fund, and the receipts and disbursements of the same shall be under the control and direction of the city council. No money shall be paid except on warrants signed by the city clerk and countersigned by the president of the city council, upon a vote of the council, or such executive or water works committee as it may appoint.

SEC. 6. The city council shall have power, from time to time, to fix the rates for supplying water to the citizens and such others as they may supply, and to contract for the rates to supply other cities, towns and communities, but all excess over and above the actual expenses shall be paid into the sinking fund to redeem the said bonds and pay the interest thereon, until the said bonds shall be fully redeemed, principal and interest, when the excess of water rates shall be paid into the city treasury, and go to lessen the general city taxes.

SEC. 7. In the construction of said water works the city council of Newport are authorized to acquire, make, construct and own, such necessary avenues, ways, bridges and aqueducts, including a bridge and aqueduct across the Ohio river, and the necessary appurtenances thereto, not interfering with the navigation of said river, buildings, viaducts and ornamental grounds as may be deemed necessary or convenient for the same, and to pass such rules and ordinances, and establish such police regulations and appoint such officers to enforce the same as may be necessary for the proper protection of said property, not inconsistent with the laws of

this State. The assessment of said water works and appurtenances for taxation shall be as may from time to time be provided by general law.

SEC. 8. That if any person or persons shall willfully, by any means whatsoever, injure or destroy any portion of the water pipes, hydrants or fixtures, or any part of the pumps, engines, buildings, avenues, viaducts, bridges, reservoirs or other appendages of said water works, or shall willfully let on the water to flow after it has been stopped in accordance with the rules provided to be enacted in the foregoing section of this act, or shall throw or cause to be thrown filth or dirt into, or otherwise render impure, the water used or furnished by said water works, such person or persons, upon conviction thereof, before the proper authorities, shall be liable for all damages occasioned by such act or acts, and shall furthermore be considered guilty of a misdemeanor and may be fined at the discretion of the jury in any sum not exceeding one thousand dollars, or be imprisoned not exceeding one year, or both. And it shall also, in like manner, be unlawful and with like penalties, for any person or persons to erect, construct or operate any slaughter house, tannery or like manufacturing establishment, or do any other thing to injure or render impure the water of said water works, on the banks of the Ohio river or the streams emptying into the same, within two miles above the pumping house of said water works. This section shall in no wise be considered as changing the law in relation to arson or house burning, or willfully setting fire to any of the buildings or other structures hereby authorized to be erected.

SEC. 9. When said water works shall have been built and put in operation, or sooner, if in the opinion of said city council it shall be to the interest of said city to do so, the management and prudential affairs connected therewith and thereto belonging, shall be entrusted to a board of trustees, to be called the trustees of the Newport water works, which shall be composed of five members, one of whom shall be the president of the city council, one member of the city council, elected by that body, and three citizens of Newport, elected by the people, at the usual time, and in the same manner as other city officers are elected, and who shall serve for six years, except that those elected at the first election shall be classified, so that the term of one of them shall expire at the end of two years, one at the end of four years, and one at the end of six years, and one trustee shall be in like manner, elected every two years, after the expiration of the term of the trustee whose term first expires. All the powers, privileges and immunities conferred by this act on the said city council of Newport, or otherwise, except as to passing the ordinance for the issuing the bonds authorized to be issued, the levying of the tax to pay the interest and to liquidate the said bonds, and the management of the sinking fund, are hereby bestowed and conferred upon the said board of trustees.

SEC. 10. For the faithful discharge of their duties, the said trustees shall be duly sworn on oath to be administered by the mayor of the city of Newport, and give a bond with good security to said city, conditioned as may from time to time be ordained by the council. They shall keep a record of their doings and proceedings, and shall once a year, or oftener if required, make a report to the city council. The said board of trustees shall annually elect one of its members president of said board. Upon the organization of said board they may

employ a clerk and such other assistants or officers as the duties of the board may require, and from time to time fix and regulate their salaries. The management and control of the water works fund, except as herein otherwise provided, shall vest in the board of trustees. Moneys shall be drawn from said fund only by a vote of the board, upon warrants signed by the clerk of the board, and countersigned by the president of the board of trustees. The city treasurer shall be the treasurer of the water works fund. The trustees shall be liable to removal by the circuit court, for just cause, upon suit instituted by the order of city council, subject to appeal to the court of appeals. In case of vacancy occasioned by death, resignation or otherwise, the city council shall by appointment fill the same, until the next city election.

SEC. 11. This act shall take effect from and after its passage.

AN ACT to amend an Act, entitled "An Act to authorize the city of Newport to supply itself and others with pure water, and to establish water works." Approved January 26, 1871.

SECTION 1. Be it enacted by the General Assembly of the Commonwealth of Kentucky, That for the purpose of facilitating the construction, completion, and extension of the water works authorized to be constructed by said act, approved January 26th, 1871, whenever, at any time, before the completion of said water works, and the furnishing of water to the citizens of Newport, or thereafter, in the opinion of the city council of the city of Newport, it shall be deemed to be the interest of said city to sell, convey and dispose of the same, or any part thereof, not including, under any circumstances, the supply main, and distributing pipes connected with said works, used to supply said city of Newport with water, to any individuals, trustees, or corporation, either in or out of the State, they are hereby authorized to do so: *Provided*, That in case of any such sale, transfer or conveyance, provision is made, by contract, for the proper and full supply of the city of Newport with pure water for all purposes; said contract shall be based upon an equitable *pro rata* cost of pumping, storing, and supplying the same to the distributing pipes, and shall not exceed the maximum price at which said supply of water shall be furnished by the purchasing party to the city council or board of water works trustees of the city of Newport of five cents per one thousand gallons of water; and no charge, howsoever, shall be made for water used for extinguishing fires, the supply of the public buildings, or other public use: *And provided further*, Such sale or transfer shall in no wise convey from the city council of the city of Newport, or the board of water works trustees, in the before-mentioned act authorized to be elected, the control or regulation of the rates or charges for water, to consumers thereof, in the city of Newport; neither shall the rates or charges for water to consumers in said city, in case of such sale, ever be higher than is now charged by the water works board of Cincinnati, or may hereafter be charged, for similar service of water to citizens or consumers of water in the city of Cincinnati, or other city that may purchase said works and be supplied with water therefrom. The price contracted to be paid for said water works, or any portion of the same, shall not be less than their actual cost, or the cost of such portion; and the sum received be applied to the liquidation of the debt authorized to be created by said act. The

rights, powers, and immunities conferred on the city council of Newport by said act, to acquire, construct and operate said water works and appurtenances, except as to condemning lands, issuing bonds in the name of the city of Newport, levying a tax on the property of the citizens of the city of Newport; also to control, manage, and extend the supply and distributing pipes; to manage the water works fund of the city of Newport; and fixing and regulating the rates of charges for the supply of water to the citizens and consumers of water in the city of Newport, and such other powers as are inherent to the proper management and control of the above, and which are hereby expressly reserved to said city council or board of water works trustees of the city of Newport, shall, in case of such sale, transfer, or conveyance, provided for in this amendment, inure to, and be conferred upon, the purchaser in like manner, and as fully as they are by said act conferred upon said city.

SEC. 2. Upon the completion of the construction of the aqueduct and bridge across the Ohio river, authorized to be constructed by the above cited act, it shall be lawful to collect tolls for traffic across the same; the said tolls shall be, for similar traffic, the same, or no more, than is now allowed by law to be charged by the Newport & Cincinnati Bridge Company for traffic across their bridge.

SEC. 3. This act shall take effect from and after its passage.

Iron Instead of Wood for Building.

Architecture in our large cities owes much to iron, and the debt increases year by year. It seems but yesterday that the first experiment was made by way of testing the usefulness of iron for building purposes; and many a New Yorker can remember that tall structure in Center street, in whose erection this material for the first time bore a prominent part. For years afterward no other attempt was made in the same direction. But, meanwhile, the facilities for obtaining and working iron increased, and by degrees builders made room in their minds for the idea that, in the essentials of strength, durability, and variety of adaptation, iron might possibly be the equal of any other material. This step gained, architects gave countenance to the novelty, and giving a reign to tasteful fancy, soon educated the public mind to an appreciation of the new building material. The final triumph is seen in the many beautiful specimens of iron architecture which ornament our principal streets.

That this has been a development of vast practical utility, no one will now question; the only wonder is that it was delayed so long. Capitalists have been compelled to recognize the advantages offered by a building material which combines that blissful element, economy, with every other essential of success. Beginning with the minor trimmings, builders have gone on progressively until beams, girders, arches, fluted columns, massive pillars, and finally entire fronts, furnish iron with a most varied field of usefulness. When whole squares are occupied with a single iron structure, like that of Stewart's retail store, and iron arches like those of the new Vanderbilt depot, may safely span a space of three hundred feet, it becomes a matter of doubt whether we have at present made more than a mere beginning in the use of this metal.

But there is another view which it is necessary to take of this subject, in the interests of the public. There is danger of taking too much for granted, both as to the safety and durability of some of these hastily erected iron buildings. And, even in those most carefully constructed,

defects of a fatal sort may too easily find admission. It is safe to assume that comparatively few of the thousands of beams and girders, upon which so much depends, are very rigorously tested before they are put in their place. Elsewhere, if not here, there has been discovered much faulty construction in this particular. The too general use of slight iron columns, as a support to beams, is open to adverse criticism. Often, perhaps usually, a structure of double width has no central support other than these iron pipe stems, which are thus made to do duty for substantial partition walls. In the absence of any system of preliminary testing, there is no guarantee against the "caving in," at any time, of the whole structure. Where, as often happens, floor after floor, from cellar to attic, is made dependent upon such frail stays as these, it becomes a very practical question how far it may be wise to carry this hazardous experiment.

The accepted theory that iron buildings are fire-proof, or that an admixture of iron renders other structures fire-proof, is not always borne out by experience. It is alleged by some that the effect of heat upon the iron components of a building is to warp and weaken them to a degree which increases the danger of destruction. But a well-built edifice of iron is capable of withstanding all ordinary accidents, and by a system of preliminary testing, and the use of stouter columns, many of the other dangers referred to may be diminished.—*N. Y. Times*.

Compressed Air as a Motor.

In an able paper by Mr. J. F. Haskins, appearing in the *Engineering and Mining Journal*, we glean some interesting statements concerning the history of this subject. Mr. Haskins, who is an earnest advocate of the system, informs us that there exist three plans underlying its utilization as far as the subject has been developed. These are "the water column," "the piston immersed in water," and the "piston simply packed and lubricated by water or other fluids." Of the first class we are informed that there are several varieties, all, in the opinion of the author, containing in them the elements of success.

They operate upon the the general plan of starting and stopping a column of water. Those at Mont Cenis are stated to have been very successful and economical. They have small engines actuated by compressed air, which operate the induction and eduction valves. They are placed at an inclination, drawing their supply of water from cisterns, thus insuring clean water. With them they compress air to 60 and 70 pounds to the inch, and sometimes more, as they may require. Other apparatus, depending on a column of water for its power, has been constructed, and there are several parties now experimenting in that direction.

Of the immersed class of compressors we are told that there are also several. They do well for low pressures, but not as well for high ones, the difficulty being that the piston, in moving, has also to move a large body of water, which, of course, absorbs an amount of power equal to its own inertia.

Concerning the vital point of transmission, the opinion is ventured, based upon the extensive experience at the Hoosac Tunnel operations, that no difficulty is experienced.—*Journal Franklin Institute*.

The Phoenix Iron Company, of Phoenixville are now manufacturing the material for the international bridge to cross the Niagara river, at Buffalo, and another to cross the Mississippi at Rock Island. The latter will be the heaviest structure of the kind in the world.

Paper Car Wheels.

Our attention is called to a new car wheel which we have examined as thoroughly as possible without taking the work to pieces. This wheel—that is, the body of it—is made of paper, and Messrs R. N. Allen and S. W. Kimball, of Brandon, Vermont, have secured a patent therefor.

Two trucks, of six wheels each, were made at Brandon for trial. After running nearly a year on Eastern roads they were transferred to a car of Pullman's Palace Car Co.'s line, under which they have been used several months, and show no signs of wear. Their construction is difficult to describe in detail without drawings and diagrams. They consist, however, mainly of a tight filling between tire and hub, of *pressed paper*—paper of the best fiber, subjected to a pressure of a ton and a half to the square inch.

But few, we suppose, are conversant with the capabilities of compressed paper. The very best "calender rolls"—used in finishing "sized" paper, and for some other purposes, are made of pressed paper, in preference to ivory, bone, steel, or other material. The reasons are that it is not only almost wholly inelastic, but yields nothing to climatic changes. Hot or cold, wet or dry, *paper* thus treated remains the same. When sufficiently pressed, it may be treated as hard wood is; it may be turned in a lathe, holes may be drilled or bored in it, it is susceptible of a high degree of polish, etc. In short it is unlike anything and everything but itself. The inventor conceived the idea of using pressed paper in the construction of car wheels, because wood and all other substances thus far tried have been found objectionable in one point or another. Paper would seem to answer the purpose admirably because it is *noiseless*; it does not swell nor shrink with the weather, it affords a stay to the tire and a lateral support in turning curves, and at the same time adapts itself to any trifling inequality of the inner surface of the surrounding tire, which wood or iron fail to do; and, finally, it seems to be stronger than any other material—many times stronger than any other material of the same weight—of which a wheel can possibly be made. Wood has been tried, not altogether with success, and the objections to steel "skeleton," or "corrugated," or "patent spokes" wheels are well understood.

In these wheels, the usual steel tire with its "rail flange" is used. Upon the axle, as a center, two heavy, cast-iron flanges are fastened parallel to each other at right angles with the axle, and in the plane of the diameter. The inside one has an 8-inch radius, the outside one completely covering the outer disk, and overlapping the tire half an inch. Through the compressed paper, from flange to flange, are passed strong bolts of the best iron, secured by nuts "screwed home" firmly, and near enough together to hold the paper in its place, without unnecessary cutting away of its fibre or weakening the flanges. And it is worthy of note, that it has never been found necessary to tighten a nut on any of them from the first day of operation to the present! The paper forms a solid wall between the axle and the tire, the flanges doing nothing but keep the paper in proper position. The strain comes upon the paper—the tire, of course, doing its duty as in every other wheel.

We can not too highly commend the liberal enterprise of the Pullman Co. in their settled policy and determination to "get the best" in every branch of car manufacture, regardless of expense, whether of money, time, or skill. The history of car building under their auspices is pre-eminently the history of the most marked and most needed improvements in whatever is essential to safety and comfort, as well as elegance in passenger equipment. We may be sure, as regards the paper wheel, that they will not adopt or recommend it unless it proves itself

superior to any other known device, and its adoption on their cars is equally a foregone conclusion should its superiority in all essential respects be thus demonstrated. We shall look, therefore, to results of farther experiments now making with great interest, and trust that capitalists and railway managers here will take a like interest therein.

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CHARLES A. DANA, Editor.

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CINCINNATI, OHIO.

RECEIVER'S SALE.

Jacob T. Martz, Receiver of the Cincinnati and Mackinaw Railroad Company, plaintiff,

vs.

The Road Bed, &c., of said Railroad Company.

The State of Ohio, Darke County Common Pleas, No. 3,280.

By virtue of an alias order of sale made by the Court of Common Pleas, within and for the county of Darke, and State of Ohio, at the June Term, A. D. 1868, of said Court, in the above entitled case, and to me, as Receiver, appointed by said Court, of the said Cincinnati and Mackinaw Railroad Company, issued and directed, I will sell at public outcry, at the door of the Court-house, in Greenville, in said County of Darke, on

SATURDAY, MAY 6, 1871,

at the hour of 2 o'clock, P. M., of said day, the following described property, rights, franchises, &c., of the said Cincinnati and Mackinaw Railroad Company, situate and being in the counties of Darke, Mercer, and Van Wert, in said State of Ohio, to-wit: The Road Bed and right of way of the said Cincinnati and Mackinaw Railroad Company for a railroad, commencing at a point near Greenville, in Darke County, aforesaid, and extending through the counties of Darke, Mercer, and Van Wert to the town of Van Wert, in said last named county, in the State of Ohio, including the bridges, fixtures, and culverts, railroad ties on the same, or intended for the said road, together with the right of way owned and held by said Company for the construction of its said road, together with all the rights and franchises of said Company for the construction of and maintaining its road in the said State of Ohio, together with all other property real and personal, belonging to said Company, in said State of Ohio, intended to be used in the construction of its said road.

Appraised at Seventeen Thousand Dollars.

Treas. of Sale, CASH.

W. A. WESTON,

Receiver, Cin. & Mack. R. R. Co.

C. CALKINS, Attorney; March 23, 1871.

23-570, St.

The Railroad Record.

E. D. MANSFIELD, - - - - - } Editors
T. W. WRIGHTSON, - - - - -
A. J. HODDER, - - - - -

CINCINNATI, - THURSDAY, APRIL 6, 1871

The Railroad Record,

PUBLISHED EVERY THURSDAY MORNING,

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The Development of Wealth and Industry in the United States.

One of the curious things in the progress of the United States is the comparatively *little effect* which the war, its losses and debts, had on the development of industry and population. That it had some effect, and in comparison with small communities a great one, there is no doubt; but that effect was not a fourth part of what even the most intelligent persons supposed. In the four years of the war, it is estimated that 500,000 persons died, who were in some way connected with the war, who were killed, died of wounds or diseases and sufferings caused by the war. This gives an average of 125,000 each year. But a careful estimate of deaths in the usual ratio for our then population shows that there were about 600,000 deaths per annum. The number who died of the war, therefore, did not make but 21 per cent. of the whole, and a large part of them would have died naturally at home. It therefore appears that the actual deaths caused by the war had but little influence directly on the increase of population, but *indirectly* it had more influence. For example, the number of marriages in Ohio were diminished 5,000 per annum during the war. This was caused by the fact that the great body of those who went to the war were young unmarried men. The number of births, in the year after the war, were of course diminished in proportion; and the same was true throughout the country. When the census of 1870 was taken, the *ratio* of increase was diminished, but the *actual* increase was pro-

digious. Then the *increment*, the actual amount added, in each decennial period, was as follows:

From 1790 to 1800.....	1,375,000
" 1800 to 1810.....	1,924,000
" 1810 to 1820.....	2,399,000
" 1820 to 1830.....	3,228,000
" 1830 to 1840.....	5,134,000
" 1840 to 1850.....	6,122,000
" 1850 to 1860.....	8,252,000
" 1860 to 1870.....	7,500,000

Thus we see that, in *actual increase*, the amount in 1870 was only 700,000 less than in the previous ten years; and, as the returns are yet imperfect, it may be there is no decrease. The decrease of immigration caused by the war had also a great effect; but with all these causes, we see the actual increase of population in ten years is near eight millions. The increase of wealth is even in greater proportion; but before we estimate that, let us turn to the *effect* of this vast increase of population on the wealth and prosperity of the *next ten years*; for this is the most interesting of all these problems. Look at it. Of 8,000,000 of people 1,600,000 are able-bodied men. If they were all common day laborers they could not get less than \$1 per day, or at 300 working days in the year \$480,000,000 in a year; in ten years \$4,800,000,000. The actual loss of perishable material consumed by this population can not be estimated at half that. The gain by machinery in these days is supposed to equal that by human labor. Then, without reference to arts or commerce, we have in the next ten years \$5,000,000,000 added to the wealth of the country by the *increment* added to the population of the country since 1860. But this increment is but slightly over a fifth part of the whole, so that on this basis *twenty five thousand millions of dollars* will be added to the wealth of the country by 1880. Call it \$20,000,000,000; and you will see that allowing for annual interest the additional wealth in 1880 will be *ten times* the entire national debt! *One per cent.* annually on the increase of wealth in this country will pay off the entire national debt! If this be correct, and it is entirely demonstrable, the reader can see what a period of extraordinary activity, industry and commercial advance must be made in the next ten years. Nothing but the hand of Providence, in some extraordinary calamity, can prevent such a result.

But let us test this increase of wealth by a reference to the facts of the last ten years. A few days since we gave the material facts in the railroad progress, by which it appeared that in ten years, from 1860 to 1870, the number of miles of railroad added were 23,000, and the increase of capital no less than \$1,300,000,000. This vast increase was in the single department of transportation, one of the least of the departments of industry. This is one of the modes in which the new labor is applied; and this progress is going on with even increased rapidity.

Take the increase of foreign commerce, which is represented by imports and exports, the aggregate for two decennial periods has been:

In 1851.....	\$439,167,366
" 1861.....	715,560,434
" 1871.....	1,020,000,000

We see that the increase of foreign commerce has been as great from 1860 to 1870, as from 1850 to 1860. This is a sort of unit representing the profits of commerce.

Take another test. It is ascertained that the increase of industrial products from 1860 to 1870 is 50 per cent. This represents the advance in the actual results of labor. On the basis of 30,000,000 population, labor represents 18,000,000,000 in ten years, and 50 per cent. of that is \$9,000,000,000 (nine thousand millions of dollars), and thus we see another and the greatest element of advance.

Let us take another, the value of property. After taking off (by act of legislature) \$180,000,000 from this valuation made by the assessors, the value of property in Ohio was an increase of \$500,000,000 on that of 1860. Ohio is about the 14th part of the American Union. And thus you see that in the mere matter of naked property, at low valuations, *seven thousand millions of dollars* were added to the value of 1860.

We present these facts as conclusive evidence of the vast and altogether unprecedented progress of wealth in this country. Indeed, our own prior history does not furnish a reliable precedent for the present. Not only do other nations present no parallel to this, but nothing in the history of the whole human race presents a parallel to the growth, strength and prosperity of this nation. May God guide it to a successful issue!

Springfield and Cincinnati Railroad.

LEBANON, OHIO, April 3d, 1871.

"EDITORS R. R. RECORD: Gents.—At a little conference among a few of our citizens to-day, the question of the whereabouts of the Springfield and Cincinnati Railroad came up, and as we were, either separately or collectively, unable to tell much about it, except that it was making very much such a noise a little way east of us as it made here a short time ago, we thought we would write you for the information, knowing that you keep posted upon such matters.

"Can you tell us where it is, or where it is going to be, if it is to be at all, and how far the thing has dragged itself along, or been dragged along by some one, and whether any one is being fooled by it again, or whether it has got over such tricks, etc.

I write for a few of the humbugged subscribers"

C. G.

Well, this is piling it on rather thick, and if it was not that this Springfield and Cincinnati speculation is an old friend of ours, to

which we have often before paid our compliments, we should hardly attempt to gratify C. G. and the "few humbugged subscribers" he represents. We can't answer all his questions now at any rate, and we have no idea that if we sought the parties who are managing this itinerant corporation, and solicit the information our friends seek, we should be any the wiser, and, consequently, neither would they.

Our humbugged friends, for whom we deeply sympathize, ought to have learned by this time (and from what they write we think they have) that a railroad, like most other things, has an inside as well as an outside, and that the outside is usually *not* the visible sign of the true state or condition of the inward. And that, as the inside workings are more powerful than those of the outside, they rule, and therefore, to judge what's up by seeing what's out, is merely to guess, and, consequently, be wrong quite as often, if not oftener, than to be right.

Really, there is no rule by which this phenomena can be explained. Thus far it has baffled the skill of our ablest men to solve. Even the actors in such matters *say* they don't understand it, and can't account for it, though they all become affected in pretty nearly the same way, differing only in intensity, according to disposition and temperament, and culture in the mysterious business.

Our friends, who confess themselves to have been humbugged by one of these things, will therefore, not expect us, we hope, to answer the questions they crowd into the last paragraph of their letter. We assure them that we are not of the insides of it, to begin with, and next, if we were, *they* would probably be the last persons on earth to give credence to what we would say upon this matter.

Our "being posted" therefore, does us very little good in this case, except so far as concerns the outward and unconcealed doings and expressions of this Springfield and Cincinnati organism, which we suppose C. G. and his associates know something of, if not as much as ourselves.

All we know is, that this company was organized to construct a railroad from Springfield to this city, through the counties of Clarke, Greene, Warren, Butler, and Hamilton. But, that afterward it concluded to verify the old maxim, that "the longest way round is the shortest way home," and to go by Dayton and include Montgomery county.

And they have done a great deal of surveying, of the rambling order we should think; and also proceeded to obtain the right of way before the line is definitely located, or the owners of the property through which this road is to pass advised whether the cuts and fills are to be very shallow or very deep. This is a little unusual, we think, but may be all right with this company. We hope so at any rate.

And then they have bought a large tract of

very valuable land for depot uses some where near the Cincinnati, Hamilton and Dayton depot grounds, which they are to pay for "*if the road is built, or the company needs it.*" So says our informant. This is a well-timed precaution and bound to inspire faith in the economy of the managers of this organization.

And again, so we learn from the daily press, this company is pressing a bill through the Legislature of Ohio, by which they can condemn to their own use the track or tracks of a competing line through the city of Dayton, and of Cincinnati too, we suppose, if the humor should so direct them. And *this too, before they have defined their own route between these points, or cast a shovel full of earth toward the construction of their own road.*

To some folks this may seem a little premature, but it is only those who are not intelligent upon such matters and who have so failed to see the equity of this measure as to call it a *Plunder Bill*, and say that the legislature would disgrace itself to pass such a law.

There are such obtuse people most every where, and while they are very annoying, they are necessary, we suppose, "to make up the world," and we must put up with them the best we can.

Now, this is about the extent of what we can tell our correspondent and his friends. "Where it is going to be," "or if it is to be at all," "or who is dragging it," "or who is fooled, etc.," it is impossible for us to positively say. They must draw their own conclusions. We have drawn ours clear out, and await patiently the proof of the soundness of our judgment, that time only can give.

The Gallipolis, McArthur & Columbus Railroad.

We give place this week to a long and interesting letter from the energetic president of this road, in which he treats, first, upon the character, value and condition of his work, and second, advances some original and valuable thoughts upon the relative merits of the 4 ft. 8½ and the new narrow or 30 inch gauge for railroads.

Mr. Langley shows that he has the object of his charge deeply at heart, and that he is moving it forward with that sort of strength and earnestness that must overcome all obstacles, and lead him on to success. Certainly such zeal in so good a cause ought to command the highest public confidence and respect, and we shall be much mistaken if the people of the country this road is intended to supply, do not partake of Mr. L's enthusiasm, and come to his aid with all the resources in their power. To do otherwise would be to sleep upon their rights, and lose perhaps one of the best opportunities they ever will have for a splendid material prosperity.

Mr. Langley's reflections upon the "gauges"

are probably to meet a local question, and worthy of the consideration of the people of his section of the country. He has evidently thought upon the subject, and, as he says, read all that he could find to read upon it. His views are, therefore, entitled to respect. Yet we are of the opinion that this "war of the gauges," like the old one upon the same question, years ago, will not be settled by discussion, but by actual experiment.

We urge all parties interested in the G., McA. & C. R. R. to read Mr. Langley's letter carefully. It will pay them to do so.

GALLIPOLIS, March 28th, 1871.

EDS R. R. RECORD:—I notice in your issue of the 23d instant an article headed, "Gallipolis, McArthur & Columbus Railroad Company," in regard to which road I propose to make a few remarks:

By the proposed route, or rather routes (for several are proposed), for said road, we enter the great coal and iron ore bed of southern Ohio at 19 to 20 miles from this place, and from this point pass continuously through said belt to Logan in Hocking county, being from 40 to 45 miles. And if located on the best route, the road will not be at any time in that distance one mile from heavy beds of coal and iron ore of superior quality, besides limestone, burrstone, fire clay, salt water, and agricultural products, in almost unlimited quantities; and while the general topography of the country, for two tiers of counties back from the river, is very rough and hilly, we find that we can get a location for our road without at any time passing two miles from an air line from here to McArthur, in Vinton county. And that if located on the best route, all things considered, viz: business, distance, grades, curves and cost, it will not cost over from \$7,000 to \$9,000 per mile to grade, bridge and prepare it for the track, and I have my doubts whether it can not be done inside of \$7,000 per mile, and I have no doubt but the old road bed from McArthur's station to Logan (about 27 miles) can be prepared for the track including about 9 miles not yet graded, at a cost not exceeding \$75,000; but to build the road for those figures the best location must be selected, the most strict economy must be practiced, middlemen, brokers and agents must be avoided as much as is practicable, the work must not be commenced until the company is prepared to carry it through to the finishing of the grading without having it saddled with a large floating debt; every man employed by the company must be required to perform his full duty.

The amount of work done and donated to the company, with the right of way through (which has nearly all been donated to the company), is doubtless worth \$150,000; and about \$300,000 to \$325,000 (of which the larger portion is already subscribed) more should, and I have no doubt will, prepare the road bed for the track. And with such a basis as

this donation gives, with the advantageous routes for a cheap road, and the immense traffic the route promises, the stock of the company should always be worth a large premium, as each subscriber will have a proportionate interest in the donation. The route is so favorable, and presents so many advantages for a very heavy business, that I have no doubt but the road will pay heavy dividends to stockholders from the start, and, if they desire it, enable them to hold as a sinking fund for the redemption of their mortgage debt (which may be created for the superstructure of the road) or to be used for the improvement of the road, the dividends on the above donation. The mineral and other resources on and near the line of this road will supply it with all the work it can do for ages.

Messrs. Paul Brothers, in your last issue, in their argument in favor of a narrow gauge railroad, say, "A railroad 50 miles in length [I suppose they refer to a 4 ft 8 in. gauge], we will not over estimate it if we say it costs \$30,000 per mile, total cost \$1,500,000." I think we can build a number one or first class road through to Logan for materially less than \$20,000 per mile.

Again, they say, "You admit the narrow gauge to be cheaper, so do we. And now Ohio is suffering for want of more mileage of railroads, and not for want of capacity in the present lines, as there is not a road in this State that could not do more than it is now doing." If such is the case, why would it not be good policy for the projectors of a railroad just to consider what amount of business their road would probably command at the start, and build their road to meet that demand; if the business would be light, regulate their grades to meet it by following as near as practicable the natural grade of the ground; they could regulate the cost of their road bed according to the amount of grade they gave it. If they had to run light trains in proportion to their capacity over their road, they pass with high speed over much higher grades than are usually adopted. When if running with trains up to the full capacity of their engines on the narrow gauge road, which they would undoubtedly have to do if they took what might be half a load for the heavier engines, they would require their grades to be cut down much flatter than would be required for the half loaded trains on a broad gauge with heavier engines, and thus in all probability make the cost of grading their narrow gauge road as much if not more than for the broad gauge for transporting half loads; then all the broad gauge would have to do as its business increased would be to lower their grades at a few heavy points, and thus increase their capacity. We have among us some (very few) advocates for a narrow gauge for our line. I am no engineer, and probably ought not to speak of such matters, but whenever a narrow gauge is spoken of to

me for a road of any considerable length and much business, it sounds to me like proposing the use of one horse and cart to do the work of a two, four or six horse team; in each case you would need but one teamster, and the six horse team would move full six times the weight of the one horse cart load the same distance per day, while the cost for manual labor would be the same, say \$1 per day for each team, thus making the cost for operating the teams much greater for the light than the heavy team in proportion to the work done. Would there not be the same relative difference in the cost for manual labor between a broad gauge with heavy equipment and narrow gauge with light equipment, besides the more rapid wear of the light superstructure and equipment if run with the same speed as the broad gauge, and to the extent of transporting an equal amount of freight in the same space of time, besides the greater danger of collisions from the great multiplicity of trains running at a high speed.

The road we propose to build, as I have before stated, will run through a mineral district, the business of which must be heavy from the start, and must rapidly increase to keep pace with the rapidly increasing consumption of coal and other freight on its line, and my recommendation to our company is to locate the road on the best route all things considered as near a straight line as is practicable, to admit of keeping it within the mineral belt (which should be reached at nearest point possible), between this and its connection with the old road bed at McArthur's station on the Marietta road, or at McArthur's. Then estimate as near as practicable what amount of business the road can command, and construct it accordingly. If the business to be done at the start will admit of heavy grades, at the few points on the route that from the nature of the ground will need them, for the purpose of materially reducing the cost of the road bed, adopt them for short distances, then as the business of the road increases reduce them. I think it far better to do so than to attempt to reduce the cost by running the road around hills, or by deep and heavy cuttings for the attainment of very low grades; by running around hills increasing the length of the road, and thereby adding to the cost of the superstructure, and adding by curvature to the dangers of operating it, and if heavy grades are adopted (say in no case over 70 feet, and I think probably none will be required over 50 feet per mile), as the business of the road increases and the company may be able to cut them down. By adopting this policy, the company with its limited means can much sooner bring into use the old road bed that is now dead capital, and soon have the whole line at work, thus inducing business enterprise and capital to come among us, and inducing the erection of more furnaces, rolling mills, all kinds of

manufactories, with the general and rapid development of the mineral and other wealth of the section through which our road will pass.

The opening of this and other roads passing through similar sections, will open the only kind of a field in which I can understand how a narrow gauge road can be made profitable, as compared with a broad gauge road, and of that I have some doubts, though on each side of the through track, extending some miles from it, there would be immense beds of mineral that must be moved to the main through track, which possibly might be done on a narrow gauge road economically, because its narrow gauge would better adapt it to following the short turns and curves that would necessarily have to be followed through so hilly a country, the hollows of which lead into the valleys through which the main track "broad gauge" passes; but when these narrow gauge trains would reach the main track they would have to be unloded into cars adapted to the main track, or the car bodies with their load would have to be shifted on to platform cars of main track, or there would have to be another pair or set of rails placed on the main track between the broad gauge rails, and these narrow gauge cars run on to that narrow track, and I suppose might be coupled to trains on main track, and run through to their destination; by the latter course the expense of an extra set of operatives (except brakemen) and engines might be avoided, and the narrow gauge made profitable; or, I suppose the narrow gauge trains might be run through on the narrow track with their own operatives and engines, but for a through road of any considerable length, that has much heavy traffic, I can not understand how there can be any advantage gained by the narrow gauge, with its additional army of expensive operators that would be required to do the work that the broad gauge would do with the smaller number.

I have read nearly everything I have seen in print for or against the narrow gauge (I mean what I have said in regard to a narrow gauge to refer to a 2 or 2½ ft. track, with height of rail and equipment to correspond), and I have seen nothing yet that could induce me to adopt the narrow gauge for any road, except when the business was comparatively light and likely to continue so, or through a section where the road was compelled to have very short curves, and where a slow rate of speed was all that was required. Admitting that the cost of construction might be far less for a given number of miles on a narrow gauge than on a broad gauge, would not the cost of maintenance be far greater in proportion to the capacity of a 2½ ft. gauge, as compared with a 4 ft. 8 in. gauge, the difference in cost of operatives alone would be a large item of expense, &c., &c.

Respectfully yours.

W. H. LANGLEY.

P. S. Expect to get a connection with the Chesapeake & Ohio road at this point, and think we will have one of the best, if not the best dividend paying roads in the State for its length, or indeed for any length. We have an experienced engineer at work who is energetically engaged in examining the different routes and parts of routes, with the object of finding the best, and will soon be prepared to commence the surveys. Geographically, there are but few points in the country as favorable for a large manufacturing city as Gallipolis; fronting on the Ohio river, about 3 or 3½ miles below the mouth of the Big Kanawha river, with high banks, presenting great advantages for bridging the river, a fine agricultural country around it, and one of the most healthy sections to be found in the country—all that is needed to make a large and populous manufacturing city of it is cheap transportation to move the wealth of the interior to the river. Give us our railroad, with moderate rates of freight, and business enterprise and capital will soon follow in its wake, and in some instances precede it; for as soon as the work is fairly commenced strangers will be among us looking out for favorable locations for business.

L.

The Equitable Life.

Mr. H. B. Hyde, the vice president and active man of the society, made our city a short visit a few days since, and was so pleased with the increased business and prospects of the society in this State, under the vigorous management of their agent here, that he concluded to give him such enlarged facilities as this new trade demanded, and for this purpose leased the large and elegant room in the rear of the Burnet House, lately occupied by the Central National Bank, which is hereafter to be known as the Cincinnati Department of the society's New York office.

This room is to be fitted up in the finest style, and supplied with all the necessary appointments for the society's extensive business in this state, and will be the most splendid business department in our city.

This is a flattering testimonial to both the enterprise of the society as well as that of its agent, Mr. T. H. Hodder, who has already established himself, by his energy and efficiency in the life assurance business, as a worthy representative of this most wonderful and prosperous organization.

ROCKPORT AND CINCINNATI RAILROAD.—At their recent meeting the Board of Directors of this road elected officers for the ensuing year—and we think made a judicious selection. Hon. Josiah Kirby, the newly elected President, has, by his own ability and inventive genius, made for himself a respectable fortune, and rank highly as a citizen. In entering upon his duties he takes with him a good business experience, with mature judgment, and a firmness that well fits him for the position.—*Gazette*.

Chesapeake and Ohio Railroad River-Routes.

At last there seems to be life in the Ohio extension of this scheme.

At any rate, here is a movement from an old quarter that indicates sufficient vitality to start the whole project in motion.

Whether it is but another spasm remains to be seen. We hope not, though we confess our fears.

The *Gazette* of the 31st has the following, sent from Ripley, Ohio.

"A meeting of the corporators of the Chesapeake and Cincinnati Railroad was held at Portsmouth, Ohio, on the 22d inst. Judge W. W. Johnson, was made Chairman, and Col. Wm. M. Boles, Secretary. There were delegates present from Lawrence, Scioto, Brown, and Clermont counties, and among other business transacted was the passage of a resolution authorizing and instructing John P. Terry, Esq., to take charge of the business of completing the survey of the proposed route of the Chesapeake and Cincinnati Railroad. This is a matter that should be attended to at once, as it is of the utmost importance that the survey may be ready to present to Mr. Huntington, on his way to Portsmouth, some time in April, and in order that no delay may be experienced in the work each county should have the money raised to bear their proportion of the expenses of the survey. This the corporators should attend to.

The prospects for getting a road along the river were never so favorable, and this should infuse new life into the citizens along the line. The advantages of this route over any other now talked of in connection with the Chesapeake and Ohio road are various, but the principle one, and the one which seems to be great desideratum with the Directors, is the easy grade. Now is the time for the people along the line to work. The assurances for building the road amount to almost positive certainty. Our citizens are wide awake, and our quota for Brown county is ready to put into the hands of Mr. Terry. What will you do in Hamilton, Clermont, and Adams?

The Springfield and Cincinnati Railroad in Columbus—A Heavy Lobby.

The heaviest lobby that has been here this winter is now in the city to operate for or against Mr. Odlin's Senate bill compelling railroad companies now running their tracks through Sixth street, Dayton, to grant the use of their track to the Short Line Railroad. All the week the claus have been gathering, and, as I predicted some days since, the affair has now assumed the shape of a square fight between the Pan Handle, Erie, and Cincinnati, Hamilton and Dayton Railroads, on the one side, and the New York Central and Short Line interests on the other. Milton Saylor leads the former combination, and Mr. Shoemaker heads the Short Line forces.

I had not supposed, until to-night, that any very serious interests were involved in the matter, but an intelligent gentleman, who has means of knowing all about it, informs that the defeat of Mr. Odlin's bill will probably end for the present, the whole Short Line project.—*Gazette*, April 5.

Just as we supposed. The life of this Springfield and Cincinnati scheme depends entirely upon what it can steal from other railroad companies; for so we, as well as others, call the objects of this bill it is trying to force through our Legislature.

Narrow Gauge Railway.

REPORT OF THE COMMITTEE APPOINTED AT THE UNION HALL MEETING, SPRINGFIELD, OHIO.

The history of existing railways would, most naturally, deter any community from engaging in any new enterprise of a like character, inasmuch as the people—original stockholders—have experienced, generally, serious loss to the extent that they have given private means to secure such constructions. It has long since become well understood that most of the existing lines of road were so expensive in construction, and were operated at such ruinous cost, that they could not be held in the interest of original constructors. The ownership or control of nearly all existing lines in Ohio has passed into the hands of remote parties, who are alien to our supposed interests, and beyond the reach of our influence, either commercial or political. Complaints of the management of existing lines are universal as the system itself, reaching all parts of our nation. Hence the need of devising and cheap means of such as we can ourselves construct, own and control in our own interests.

These views have impelled popular attention to the subject of narrow gauge railways in various parts of the United States and the Canadian Dominion, and although a few of this class of roads are already in successful operation, the subject has not been canvassed with a view to the general and wide spread advantages, which may be involved in making a system of narrow gauges extensive as the system of wide gauges.

It is claimed by responsible parties, who have thoroughly investigated the subject, that a narrow gauge three feet railway, capable of doing the ordinary business of any of our present lines, may be constructed at about one-third the cost of the usual Ohio gauge, and that the cost of equipment and operating will show corresponding advantages in favor of the narrow gauge.

The British Association, of Liverpool, has lately procured the thorough investigation of the practicability of cheaper transportation by means of narrower tracks. The report of the committee is favorable. They say:

"The wagons for a line of three feet gauge weigh each one ton, and carry a maximum load of three tons. Supposing that the same number of wagons and trains were run on the narrow gauge as on the broad, it follows that the average one ton of merchandise now carried, would easily be taken in a wagon weighing one ton instead of four tons; and that the gross load passing over the line for one year would be only 20,000,000 tons instead of 50,000,000, while the same amount of paying weight would be carried in either case; that is, the small wagons, which are capable of carrying three times the weight of goods now actually carried in a four-ton wagon, would only have to carry one-third of that quantity, and would produce the same paying load as the heavier wagons."

One of the ablest of our American journalists, in briefly commenting on the foregoing, says:

"The basis of these statements is not only the careful figuring of the engineers, but to a large extent, the actual experience in Wales and elsewhere, where the narrow gauge has been in successful operation. While the commercial history growing out of the development of the West has shown how largely rails must supersede water transportation in America, it is also equally obvious to one who

takes note of the freight cars (or 'wagons,' as the English call them,) of now-a-days, their enormous weight greatly exceeding that of the burden they are able to carry, that there is need of great modifications of the present system before the best advantages of the railroad system will be gained. The demand for improvements is especially imperative where hundreds of millions of bushels of grain, and millions of tons of coal, are to be annually transported over such distances that their cost is at present more than doubled in getting from the producer to the consumer. If England needs the new freight gauge, America needs it far more."

The Paul Brothers, Civil Engineers, of Akron, Ohio, having thoroughly prepared themselves, now make a specialty of narrow gauge railways, and have already constructed one line in Ohio for local purposes. On our application they have furnished us a brief statement of estimates, &c., which comes within the purposes for which this committee was constituted, and we present as follows:

"The narrow gauge is attracting a great deal of attention, and our time is very much taken up in answering letters upon this subject to parties in all parts of the United States. Of the lines now in successful operation in Europe, we have obtained statistics in regard to rolling stock, operating of roads, &c., and in no instance are their expenses as great as upon the wider gauges. These lines carry passengers and general freight. We have quite a number of narrow gauges in this country, and about fifteen miles in successful operation in this (Summit) county for mineral traffic.

"The cars upon these roads in this vicinity are mostly loose-wheeled cars, and weigh about one-third the load they carry, but are not considered advisable for roads of over ten miles in length. The car considered best adapted for long lines is a tight-wheeled car, of which we have some in use, and of the kind generally adopted in Europe upon the narrow gauges.

"Locomotives, eight to twelve tons, cost \$4,500 to \$7,000.

"Four-wheeled house cars, weight 4,000, carrying 8,000 lbs, cost \$185 to \$200.

"Passenger cars, capacity for thirty passengers, cost, \$1,000 and upward, according to style and finish.

"Iron rail, thirty-two pounds per yard, costs \$3,750 per mile.

"Ties, 2,266 per mile, at twenty-five cents each, \$566 per mile.

"Joints and spikes, \$400 per mile.

"Track laying, \$250 per mile.

"Grading and masonry, (ordinary) \$2,500.

"Bridging, can not estimate without survey.

"Right of way, can not estimate.

"Ballasting, according to circumstances, probably 2,000 yards per mile.

"The above gives a chance for a general estimate without buildings. We have refrained from giving estimates as a general thing, without specific knowledge, as there are many instances where the traffic would be light, in which a still lighter rail might be used, and locomotives not exceeding five tons in weight would answer every purpose."

We have additional information on the subject of the greatly reduced cost of these roads, in the fact, that a line of road three and a half feet gauge, from Toronto, Capital of Ontario, Canada, two hundred miles in length, stretching from that lake port into the interior of the Province, has been put under contract at \$15,000 per mile, including equipment. "Equipment for the first forty miles:

six engines, eight passenger cars, (each to carry thirty six passengers,) three baggage, fifty four-wheel box and house cars, and fifty six-wheel platform cars. Twenty-five miles of iron are already laid, upon which a speed of thirty miles per hour has frequently been made."

From the specifications in this contract we extract the following additional particulars:

"Rail, 40 lbs per yard; curves, 462 feet radius; grades, 1 in 48, or 110 feet to the mile; track, well laid, 20 inches ballast; ties, 7 feet long, 7 by 4½ inches; light rolling stock; engines 11 by 18 inch cylinders, 3 feet 3 inch driving wheels, four or six wheels coupled; center of gravity kept low; flooring of cars 2 feet 7 inches from rail; passenger cars thirty-five feet long, 8 feet 6 inches wide, carry 36 passengers, 3 pairs wheels 2 feet in diameter."

This subject has been under investigation among the enterprising and intelligent people of Massachusetts, and recently indorsed by a committee of the Legislature of the Commonwealth as worthy of encouragement, recommending 3 feet gauge.

We need not limit the feasibility of these narrow gauge roads to short lines and strictly local purposes, in view of known facts. The needs of cheap modes of transportation and universal in the interior of the continent, are therefore if practicable for the purposes we have immediately in view, they may be constituted into a system, having connections eastward to the seaboard, westward to the limits of civilization, permeating every section of production and trade. They would constitute a most thorough means of development of the resources of the country, and by cheapening freights enhance the local or home value of products.

By adopting the policy relied upon for the construction of the Cincinnati Southern Railway (through Kentucky's sacred soil,) raising the means by public credit, and through locally constituted authorities assuming permanent local control of these lines, the interests of the people will no doubt be best served. There is justice in requiring all to contribute to those things of a public nature which diffuse advantages to all alike. General contribution and permanent local control are features of the first importance to be considered in any new enterprise of this kind which the people may undertake. If there is any force in the argument that such measures are contrary to the letter or spirit of our Ohio Constitution, let us take measures to change the Constitution. Let us have such judicious safeguards enacted in the legislation on the subject as our best men can suggest, and with a public sentiment alive to the needs of our day, we can proceed to secure advantages of a new system of cheap transportation, which will be of inestimable value to the industries of our State.

An immediate want of the communities represented in the meeting which authorized this committee of investigation, is a railway eastward to the coal and iron counties of South-eastern Ohio. We can build a narrow gauge with private means, through co-operation of the people in the towns and counties through which such a line must pass. But adhering to the cardinal ideas of diffusing the cost as well as benefits, and assuring permanency in ownership and control, the better plan of procedure seems to be through public authorities, and by means of public credit.

Coal is to-day advertised for sale on cars in Columbus, at nine cents per bushel. The same coal, transported from the Hocking region over a narrow gauge road, may be put

down in Springfield, and Troy, and Dayton at seven or eight cents per bushel, thus making practicable in these several localities enterprises in all branches of iron manufacture.

GEORGE H. FREY,
On behalf of the Committee.
SPRINGFIELD, O., March 23, 1871.

THE RAILROAD OUTLOOK ENCOURAGING—
LIGHT AHEAD—Railroad prospects are growing brighter daily, and our citizens seem to feel renewed confidence in the completion of our Eastern line to connect with the great Chesapeake & Ohio Railroad, since the strong encouragement given by the president of that road to Col. Trimble on his recent visit to New York. All of course understand that if the C. & O. adopts our line as its connecting link with Cincinnati and Dayton, its success is assured beyond doubt, and Hillsboro will be a point in one of the great railroad lines across the continent.

As an indication of the hopeful spirit prevailing, we may state that the quota of our town for the expense of the survey of the Symmes creek line and the new line from here to Cincinnati, amounting to \$500, was all subscribed last week, in a few hours.

Col. Trimble and Capt. Gore, his efficient chief engineer, are now reconnoitering on the line west of here, and in a few days will enter the field with a full engineering corps, either on that portion of the line, or the Symmes creek route, as may be decided upon.
—Hillsboro Gazette.

NORTHERN PACIFIC RAILROAD—The following items of progress are authorized by John Ross, who has the contract for laying on the east division of the road.

The party expected to complete the iron to Mud river, 28 miles east of Brainard, on Saturday, January 21, save a little ballasting here and there. It is expected to complete the track laying to Brainard by March 1.

Nine locomotives, 130 flat and 20 box cars comprise the rolling stock now in operation. Four locomotives and 70 cars are on the way. Sixteen hundred men are at work on the east division. The worst part is built; the roughest territory, the heaviest swamps, and the most difficult piling and bridging. The bridge across the Mississippi will be completed as soon as the track is done to Brainard. This will enable the iron to be laid immediately from the river west, as all the heavy grading will be ready by March. There are two engine houses at the Junction, and one 30 miles west. A third will be built at Mud river, the end of the track.

ADULTERATION OF PAPER.—Few persons are aware of the extent to which paper is adulterated by fine white clay, for the purpose of increasing the weight for a given thickness, and thus obtaining a higher price for the article. The substance mainly used for this purpose is sulphate of lime, which gives to the paper a good color and an apparent firmness of texture, but which really weakens it, and materially affects its durability. Paper of good quality ought not to leave, after burning, more than two per cent. of ash; but it is quite common to meet with paper of which one-third or one-fourth consists of silica and clay. Ten years ago it was estimated by good authority that sixty thousand tons of kaolin were used in the manufacture of paper in Europe, instead of rags; and it is probable that the amount employed at the present time is vastly greater in proportion both in Europe and America.

THE ORIGIN OF LOCOMOTIVES.—Somewhere about the year 1780, so runs the tale, a traveling millwright—in those days of the kings of mechanics—foot-sore, and with the broadest of northern Doric accent, stopped at Soho, a locality once indicative of field sports, but then and now the factory of Boulton & Watt, and asked for work. His aspect was little better than one of "beggary and poor looks," and Mr. Boulton had bidden him God speed to some other workshop, when, as he was turning away sorrowfully, Mr. B. suddenly called the poor fellow back: "What kind of hat's you got on your head, my man?" "It's just tinner, sir," replied the man. "Tinner, my man!" ejaculated the manufacturer; "just let me look at it—where on earth did you get it?" "I just turned it in the lathe," said the mechanic, with a just flush of pride. "But it's oval, not round, my man," said Mr. Boulton, in surprise, "and lathes turn things round." "Aweel! I just gar'd the lathe gang nither gate to please me, and I'd a long journey before me, an' I'd thocht I'd have a hat to keep out water; and I had no muckle to spare, so I just made ane." By his inborn ingenuity the man had invented the oval lathe, and made his hat with it, and the hat very soon led to making his fortune, so mysteriously do trifles work out great ends. The fact was, Mr. Boulton was a man of sharp penetration, and not one at all likely, in those days when good workmen were scarce, to lose sight of so valuable a helper when he found him; and so the alter famous Wm. Murdoch took suit and service under Boulton & Watt, and in 1784 made the first wheel vehicle impelled by steam in England.—*Scientific American.*

THE LIFE OF RAILS.—In the last annual report of the Lehigh Valley Railroad Company some interesting facts are given concerning the use of steel rails on the road. The experience of the past year has been satisfactory. The steel rails laid in 1864, on the Beaver Meadow division, look as well as they did a year since, with the exception of three rails, which show signs of wearing out. During the past year 13 93 miles of track have been relaid with steel, making the amount of steel track now 32.31 miles. In 1869 the company laid 1,530 tons of the best English iron rails, guaranteed to last from five to seven years; but they have not proved satisfactory, and the report says that it is demonstrated that "nothing short of all steel, or steel-headed rails will prove economical under the present heavy and rapidly increasing traffic of the road." The relative value of steel and iron is illustrated by the experience at the scales at Packerton. The first iron rails laid upon the scales lasted 1 year and 23 days, and passed a tonnage of 2,263,675 tons. The second set of iron rails were in use 7 months and 19 days, and passed a tonnage of 1,524,870 tons. Steel rails laid May 28, 1869, have passed 5,509,381 tons and show no perceptible wear. The company has contracted for 1,000 tons of steel rails to be laid this year, and we judge that before many years the whole road will be relaid with steel. All our other railroads having a heavy traffic to carry will probably be relaid in the same manner.—*Eve. Bulletin.*

The trade of the United States with Mexico is now as follows, according to the latest official returns: Exports from the United States to Mexico in 1869, \$3,837,699; imports from Mexico to the United States in 1869, \$7,232,006.

WASHINGTON & RICHMOND RAILROAD.—The Governor of Virginia has signed the bill chartering the Washington & Richmond Railroad Company, some of the conditions of which, says the *Baltimore Sun*, are not likely to be very burdensome to the Pennsylvania Railroad, in whose interest it was passed, to-wit: the indorsement of the bonds of the Norfolk & Great Western road by the Pennsylvania company is not required till \$2,000,000 of solvent subscriptions have been made to the stock of the road, and no one knows where they are to come from; and the guarantee of \$15,000 per mile to the bonds of the Piedmont & Potomac road by the Pennsylvania company, another of the conditions of the Washington & Richmond charter, is only for the superstructure and equipment of that road. Of course the road bed must be made from means otherwise raised before this guarantee can be demanded. This road is to run from the Chain bridge, near Georgetown, to Aldie, in Loudoun, and thence to the Alexandria & Manassas road, at or near Rectortown, and thence to the Shenandoah Valley road, at or near Luray.

NARROW GAUGE RAILWAYS IN MASSACHUSETTS.—A joint committee of the Massachusetts Legislature have reported a bill to authorize the construction of narrow gauge railways. The bill provides that any branch railway hereafter constructed in this State may adopt a gauge of three feet on the existing gauge or four feet eight or one-half inches, and no other gauges shall be used in this State. Any association of persons, a majority of whom shall be citizens of this Commonwealth, and all of whom shall be citizens of the United States, is authorized to locate, construct, maintain, and operate, within the limits of any town in this State, a branch railway with a gauge of three feet, with suitable tracks, stations and equipment; provided, that at a meeting of the legal voters of said town, two-thirds of such voters shall authorize the construction of the road. Upon recording articles of association the association shall become a body corporate, with all the powers and privileges, and subject to the duties and liabilities affecting railway corporations. Any railway corporation now established may locate, and maintain as a part of its railway system, one or more narrow gauge branch roads, provided the county commissioners where the road is to be located determine that the public convenience or necessity require it. The bill also makes provision for the transfer of freight from the narrow gauge roads to the existing roads.

A New Motive power.

The successful tunneling of the Alps has so clearly demonstrated the value of compressed air, as a motive power for driving machinery, that on every hand preparations are in progress to utilize it, not only in propelling stationary but in running locomotive machinery. The Mont Cenis tunnel would not have been completed had it not been for the use of compressed air. The tops of the mountains were too high above the road-bed to sink shafts from the surface, and the men could not labor so far beneath the earth without some means of ventilation. Compressed air furnished not only all the power requisite for the drilling machinery, but an abundance of pure, fresh air for respiration. The quartz rocks were so hard that the action of the drill produced such a halo of sparks that no other light was requisite when the drill's were in operation. Here were scores of men under the crest of the Alps—miles from the entrances of the tunnel and the pure breezes of heaven—yet not the same time fully and constantly supplied with power to work

their machinery, sufficient light for all purposes, pure, wholesome air, and that too, at a temperature best suited for constant and comfortable employment.

Streams of water near the entrances of the tunnel, on both sides of the Alps, sufficient to drive machinery to compress the air, were easily found. This compressed air was soon demonstrated as amply sufficient to work a piston similar to the working of machinery by means of steam but without either its heat or danger. Some of the machines used were of 250 horse power. After the machinery was complete the sole expense of the motive power, beyond oiling and ordinary wear and tear, was the necessary oversight of the water power. Fuel was unnecessary, and the danger of explosion was no more feared than an extra breeze of wind to a fatigued traveler.

By means so simple, yet so powerful and efficient, this great work was steadily carried on through hard quartz rock, much of the distance through white crystal quartz nearly as hard as a diamond. Holes, three inches in diameter and three feet in depth were drilled. Nearly a hundred of these would be drilled before charging, and then machinery would be withdrawn a few paces till all these cavities could be charged, and the whole exploded at one time, bringing down an immense amount of rock to be removed by the railroad, which was pushed forward on both sides of the mountains as fast as the tunnel progressed. Thus, on and on, by night and by day, this great work was pushed. Neither summer's heat nor winter's cold interrupted their work or affected their machinery.—*Chicago Journal of Commerce.*

FAST TRAINS.—We commend to certain of our cotemporaries who took us to task for our strictures on "the fast-train folly," the following from Herapath's (London) *Railway Journal*, of December 31:

There is one way of improving railway property which requires neither the expenditure of more capital nor any alteration or addition to the line of works. It would have a most potent influence on the rate of dividend, would be easy of accomplishment, would tend greatly to the prevention of accidents, and would therefore tend to promote traffic while reducing working expenses prodigiously. A wonderful cure, verily! What may it be? It is an expedient as simple as effective. It is only to reduce the speed of the trains. We have long pointed to this remedy. But simple as it is it is a most difficult thing to do. If any one were to invent a means of carrying on the war of trains in a more intensified degree, he might be listened to with eagerness, but the man who counsels peace and good-will toward neighbors has nothing new to propose, while he places himself in direct opposition to the active measures of the day. The very topmost speed is that which each Company strives to gain. If, however, moderation would only take the place of competition as a rule of conduct in railway matters, the result would be an immense benefit to railway proprietors. The life of an engine and the life of a rail, nay, the life of a passenger, would be lengthened considerably, and while railway Companies thus saved large sums in working expenditure, the public would be accommodated in a more sensible manner.

The surveyors of the Tehuantepec expedition, at last accounts, were on the mountain east of Tarifa. If water can be obtained there for the supply of the summit level, a canal can be built at a less cost than by any other route. A party of navy officers are surveying the head waters of the Almoleya river and other streams west of Tarifa. If, as is feared, an adequate supply of water, is not found, the party will proceed to Nicaragua.

United States Securities.

6s of 1881.

Dated 1861, and redeemable in 20 years from January 1st and July 1st of that year. Interest 6 per cent. in gold, payable semi-annually, January 1st and July 1st. These bonds were issued in three series:

Under act Feb. 8, 1861 (dated variously in 1861) .. \$18,415,000
Under act July 17 and Aug. 5, 1861 (dated Nov. 16, 1861)... 50,000,000
Under act July 17 and Aug. 5, 1861, in exch. for 7-30s (Nov. 16, 1861)..... 139,317,150
Under act March 3, 1863, and principal made especially payable in gold coin (dated June 15, 1864)..... 75,000,000

5-20s of 1862.

Commonly termed OLD 5-20s. Dated May 1st, 1862. Redeemable after 5 years, and payable in 20 years from date. Interest 6 per cent. in gold, payable 1st of May and November.

Issued under act Feb. 25, 1862...\$514,771,600

5-20s of 1864.

Dated Nov. 1st, 1864. Redeemable after 5 and payable in 20 years. Interest 6 per cent in gold, payable 1st May and November:

Issued under act March 3, 1864 (principal specified as payable in gold) \$3,882,500
Issued under act June 30, 1864... 125,561,300

5-20s of 1865.

Dated Nov. 1st, 1865. Redeemable after 5 and payable in 20 years. Interest 6 per cent in gold, payable 1st May and November:

Issued under act March 3, 1865 \$197,777,250

5-20s of 1865.

Dated July 1st, 1865. Interest 6 per cent in gold, payable January and July. They are redeemable in 5 and payable in 20 years:

Issued under act March 3, 1865, in exch. for 7-30s converted, and amount Aug. 1, 1868, to...\$332,928,850

5-20s of 1867.

Dated July 1st, 1867. Redeemable in 5 and payable in 20 years. Interest 6 per cent. in gold, payable 1st Jan. and July:

Issued under act March 3, 1865, in exch. for 7-30 notes, and amount Aug. 1, 1868, to.....\$371,346,350

5-20s of 1868.

Dated July 1st, 1868. Redeemable in 5 years and payable in 20 years. Interest 6 per cent. in gold, payable Jan. and July 1st:

Issued under act March 3, 1865, in exch. for 7-30 notes, and amount Aug. 1, 1868, to.....\$39,000,000

10-40s.

Dated March 1st, 1864. Redeemable in 10 and payable in 40 years. Interest 5 per cent in gold, payable 1st of March and September on all registered bonds, and on all coupon bonds of the denomination of \$500 and \$1,000. On the \$50 and \$100 bonds interest is paid annually, March 1st:

Issued under act March 3, 1863, and supplement March 3, 1864, principal payable in gold.....\$291,567,300

U. S. PACIFIC RAILROAD SECURITIES.

Dated January 16, 1865, and variously thereafter. These bonds are issued by the Government under acts of July 1st, 1862, and

July 2d, 1864, to companies receiving their charter from Congress, which gives them the right to construct railroads to and from the Pacific coast, and on the completion of each twenty miles of track to receive at the rate of \$16,000, \$32,000 or \$48,000 per mile, according to the difficulty of constructing the same. They are payable thirty years from date of issue; and are registered in bonds of \$1,000, \$5,000, and \$10,000.

All of the Government bonds are issued "Coupon" or "Registered." Coupon bonds can be changed into registered bonds, but registered bonds can not be changed into coupon. Coupon bonds are in denominations of \$50, \$100, \$500 and \$1,000, the registered bonds the same, with the addition of \$5,600 and \$10,000.

TIME TELEGRAMS.—An important act is now pending in the State Legislature, requiring telegraph companies to record the time at which each message is received by them for transmission, and to write or print the same upon the copy as delivered at its destination. The simple law in question would cause every message to bear upon its face the evidence of any unusual or unnecessary delay which now pass undetected, would impose no onerous burden upon the companies, nor would it in any way increase the expenses of transmitting messages, but its effect would be good in preventing many of the delays in the forwarding of dispatches which may now pass unnoticed.

TUNNEL TO LAKE BIOLER, CALIFORNIA.—According to the *Auburn Stars and Stripes*, Von Schmidt & Co. will commence a tunnel for tapping Lake Bigler within a month or six weeks. The tunnel will be commenced at the head of Squaw Valley, where the distance through the mountains will be about three miles. The time necessary to complete the tunnel is estimated at twenty months. The project has been talked of for years, and there is no doubt of its being feasible—the only question is, will it pay? One thing in its favor is, that the supply would be perpetual and ample. The flow of one hundred thousand inches from the lake to this side of the Sierras would make scarcely any perceptible difference in its height.

RAPID GROWTH OF TIMBER.—The statement made by our Lane county correspondent relative to land in Oregon, which twenty years ago was prairie, but which now is covered with a young and vigorous growth of timber, is one which would be apt to strike a stranger with surprise. Yet such is the fact. We have no doubt that since the settlement in the Willametta Valley by white people, the area of timber land instead of decreasing has actually been increasing. For one acre denuded of its forest by the settlers in our timber land, two acres of prairie have doubtly been covered with a thick and thrifty growth of young timber. It is, indeed, astonishing to witness the steady encroachments made upon our prairies by the ever-advancing forests. We have noticed the same fact in the Tualatin plains, which is spoken of by our correspondent. Land, which twenty years ago was prairie, is now covered with a heavy growth of young timber.—*Oregon Herald*.

Analysis made by an experienced Eastern chemist, it is claimed, shows Utah salt to be purer than the famous product of Turks Island, and it has been found that notwithstanding the present high rates of freight on the Union and Central Pacific Railroads, it can be furnished to points as far east as the Mississippi river, and as far west as San Francisco, at a profit to the manufacturers.

Michigan's Undeveloped Wealth.

The immense wealth of Michigan, yet undeveloped, is scarcely suspected by the best informed. The following items from the *Detroit Free Press'* account of Prof. Winchell's survey will be new to most people:

An undeveloped deposit of fine building stone, in Little Traverse bay, has been already alluded to. The adaptation of the Ionia stone to architectural purposes, has been recently demonstrated by actual experience. A similar appearance is presented by dressed specimens of the Lake Superior sandstone, quarried near Marquette. Recently, there has also been opened a new quarry in the Marshall sandstone, in the southern part of Jackson county. The stone presents a grayish-green color; it is homogenous in structure, and sufficiently coherent for ordinary purposes.

Within the limits of the Marquette iron region are deposits of marble which promise to develop into a product of commercial importance. In the Menominee region, as is known, occur beds of beautiful white marble, which possesses the fineness of grain, the purity and translucency of good statuary marble.

The State is supplied with unlimited quantities of material for quicklime, and hydraulic limes of the first class.

In respect to clays, there are probably no varieties wanting. I make especial note of a beautiful material for the manufacture of white and lemon colored bricks and wares occurring in the banks of Spring lake, near Grand Haven. Undoubtedly similar clays exist in many localities.

The explorations of the survey have revealed the probable extension of valuable gypsum deposits across the northern portion of the peninsula.

The salt product of the State is to be the subject of investigation, by a special assistant. The matter is postponed to another year. In the meantime, it may not be amiss to state that the manufacture is extending and improving.

The Huron gritstones retain their pre-eminence in the market, unimpaired; and it is known that superior honestones and oilstones may be wrought out from the Huronian schists of the Upper Peninsula.

Unlimited quantities of coloring substances are afforded by the ochre and manganese beds of various parts of the State. Yellow and red ochres are especially abundant in the St. Mary's Peninsula.

The swamp lands of the State afford vast quantities of peat for all the varied uses to which that substance can be applied.

WATERPROOF GLUE.—We find the following in the *Builder*: "One ounce of gum sandarac and one ounce of mastic are to be dissolved together in a pint of alcohol, to which an ounce of white turpentine is added. At the same time a very thick glue is to be kept ready mixed with a little isinglass. The solution of the resin in alcohol is to be heated to boiling in a glue pot, and the glue added gradually with constant stirring, so as to render the whole mass homogeneous. After the mixture is strained through a cloth it is ready for use and is to be applied hot. It dries quickly and becomes very hard, and surfaces of wood united by it do not separate when immersed in water."

To prevent the spontaneous combustion of coal on board ships and in coal bunkers on steam vessels, a sprinkling of coal tar is used.

Railroad Items.

—The quantity of public land owned by speculators, including railroads, is about 740,000,000 of acres. This leaves over 900,000,000 to be taken by settlers. The land owned by the railroads and speculators is also for sale to settlers, so there is no occupied land enough in the country to give from sixteen to seventeen millions of men a farm of one hundred acres. The railroads are making this land accessible, and the man who pays ten dollars an acre with railroads gets his land cheaper than he would pay twenty-five cents an acre without railroads.

—A law has just been passed by the Ohio Legislature which requires railroads to construct platforms or aprons between passenger cars upon their lines, with side-boards or network of wire or strap-iron at each side of said bridges, of at least equal height with the ordinary railings upon car platforms.

—The bridge across the Mississippi at Brainerd, Minnesota, completes the Northern Pacific Railroad 113 miles West from Lake Superior. The grade is finished 150 miles further, and, at the present rate of progress, trains will run to Red River before September next.

—The *Wheeling Register* states that three or four short narrow gauge railways are talked of in West Virginia. The latest project is a narrow gauge road from Petersburg, Grant county, via Romney, to some point on the Baltimore and Ohio Railroad.

—There are now 400 Chinese and 300 white laborers at work on the Northern Pacific Railroad. The Company are pushing the work vigorously, but will undoubtedly avail themselves of the six months' extension of time to complete the first section.

—The Denver and Golden City Railroad transported 5,245,307 pounds of freight, from its commencement last October to last February 1st, says Carter & Co.'s Circular for March.

—Of sixteen English Railways, each carried over 5,000,000 passengers in 1869, grading from 6,991,371 as given to 36,893,701. Five roads carried over 20,000,000 each.

—Capitalists are now talking of building a thousand mile railroad across the Andes, at a cost of \$30,000,000. It is to connect the Argentine Republic with Chili.

—The earnings of the Central Pacific Railroad Company for the month of January were in 1871 \$524,480; in 1870, \$413,104; increase \$111,376.

—A colony of French Canadians have purchased 23,000 acres of land of the Union Pacific Railroad Company, and will settle some fifty families the present season.

—Of 90,000,000 railway passengers in France last year, only two passengers and four railway servants were killed, and 112 passengers and 61 servants injured.

—In 1867, there were 9,000 miles of railway being operated in Germany, and in 1869 their receipts amounted to \$75,900,000.

—Out of the 93 counties in Indiana, 71 are crossed by one or more railroads.

—The exports of cotton to Great Britain this year already exceed those for the same period in 1870, 548,000 bales.

—There are but twenty-six cubic feet of gold now used in the world.

—Soluble glass is coming into use in Europe for "waxing" floors, and is found to answer the purpose admirably. The sailor's idea of copper-bottoming the tops of the houses with sheet tin ain't so bad after all.

THE RAILROAD CAZETTE, published in Chicago, by A. N. KELLOGG, is a Weekly Illustrated Journal of 21 pages, as large as those of *Every Saturday*.

It contains a complete record of railroad news:—the progress of new roads, elections and appointments of officers, contracts let and to be let, summaries of annual reports, illustrated descriptions of railroad improvements, articles both original and selected on railroad operation and civil and mechanical engineering, and discussions of the relations of railroad companies to the community.

This journal is prepared especially for stockholders, directors, and officers of railroads, and all railroad employees. Price \$4 per annum, in advance.

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CHARLES A. DANA, Editor.

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In addition to their absolute safety, these Bonds yield an income larger than any other first-class security. Persons holding United States 5-4's can, by converting them into Northern Pacifics, increase their yearly income one-third, and still have a perfectly reliable investment.

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Those living in localities remote from Banks, may send money, or other bonds, directly to us by express, and we will send back Northern Pacific Bonds at our own risk and without cost to the investor. For further information, pamphlets, maps, etc., call on or address the undersigned, or any of the Banks or Bankers employed to sell this Loan.

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CINCINNATI, OHIO.

RECEIVER'S SALE.

Jacob T. Martz, Receiver of the Cincinnati and Mackinaw Railroad Company, plaintiff,

vs.

The Road Bed, &c., of said Railroad Company.

The State of Ohio, Dorke County Common Pleas, No. 3,280.

By virtue of an alias order of sale made by the Court of Common Pleas, within and for the county of Darke, and State of Ohio, at the June Term, A. D. 1868, of said Court, in the above entitled case, and to me, as Receiver, appointed by said Court, of the said Cincinnati and Mackinaw Railroad Company, issued and directed, I will sell at public outcry, at the door of the Court-house, in Greenville, in said County of Darke, on

SATURDAY, MAY 6, 1871,

at the hour of 2 o'clock, P. M., of said day, the following described property, rights, franchises, &c., of the said Cincinnati and Mackinaw Railroad Company, situated and being in the counties of Darke, Mercer, and Van Wert, in said State of Ohio, to-wit: The Road Bed and right of way of the said Cincinnati and Mackinaw Railroad Company for a railroad, commencing at a point near Greenville, in Darke County, aforesaid, and extending through the counties of Darke, Mercer, and Van Wert to the town of Van Wert, in said last named county, in the State of Ohio, including the bridges, fixtures, and culverts, railroad ties on the same, or intended for the said road, together with the right of way owned and held by said Company for the construction of its said road, together with all the rights and franchises of said Company for the construction of and maintaining its road in the said State of Ohio, together with all other property real and personal, belonging to said Company, in said State of Ohio, intended to be used in the construction of its said road.

Appraised at Seventeen Thousand Dollars.

Terms of Sale, CASH.

W. A. WESTON,
Receiver, Cin. & Mack. R. R. Co.
C. CALKINS, Attorney; March 23, 1871. 23-3-70, St.

The Railroad Record.

E. D. MANSFIELD, - - - - } Editors
T. WRIGHTSON, - - - - }
A. J. HODDER, - - - - }

CINCINNATI, - THURSDAY, APRIL 13, 1871

The Railroad Record,

PUBLISHED EVERY THURSDAY MORNING,

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The "Tunnel," and its relation to the Growth of Cincinnati.

We propose to exhibit some reasons for the completion of the "tunnel," which have not been heretofore considered, and which bear directly on the growth and prosperity of this city. To do this, we must describe in some measure what the city is, and what it must become, if its people have any sagacity or its development any proportion to that of other American cities. In this country, though cities grow in different ratios, slow or fast, yet they all grow. Assuming this as a primary fact, we shall endeavor to show: 1. At what rate Cincinnati may be expected to grow; 2. In what directions; 3. What facilities and means should be furnished to aid that growth; and 4. How far those facilities and means when furnished will return to the city, and to those who advance money for enterprises, profits for their advancements. The place which the tunnel will have (if the general scheme we advocate be adopted) is that of one of the principal means of extending the growth of the city, and giving values and facilities to property and population which lie north of the city.

In making this exhibit we shall be obliged to go over more ground, and take a wider view, than we have been accustomed to take in this paper; but this is one of our objects, to take a more comprehensive view of great enterprises and plans for the future than is taken in mere newspapers. Let us then look

at Cincinnati, as to what it is, and what it may become.

1. What is and will be the growth of Cincinnati? We readily concede that if we are to regard this city as ceasing to grow, as becoming a sort of Amsterdam, where a man never builds a house except for the necessity of his own use, and never expects to sell it at its value; if that is to be the case, we concede that no great enterprise is worth undertaking, the Southern road, the bridges, and the avenues, might all in such case be thrown aside. But such is not the case with western towns, and can not be. We must recollect, also, that all public improvements are both cause and effect; they are not only the results of growth but the cause of growth; and the men of business and property can not afford to neglect them. The lesson of American cities is that *all* useful public improvements have *paid* in the fullest sense of the term. New York is the city which has grown the most; but it is also that in which the most costly and enormous improvements have been made.

Two are now proposed, and will probably be made, which exceed anything in the cities of the world; one is the bridge over the East river to Brooklyn, and the other the railroad viaduct. The cost of these will be enormous, but they will be made, and they are scarcely greater than what are already made, in the Central park and the magnificent avenues. But let us take what Cincinnati is, and then compare it with that city which is almost exactly like it, in every particular, Philadelphia. *First.* What may we expect Cincinnati to be? The growth of Cincinnati in thirty years has been:

In 1840.....	46,300,	Increase.
" 1850.....	115,100,	150 per cent.
" 1860.....	161,000,	40 "
" 1870.....	218,000,	36 "

The diminution of the *ratio* (a diminution always occurring in the later periods of cities) is evidently arrested, and a decennial increase of 36 per cent. is the least which can be expected. Then, the population of the next 30 years will be in round numbers as follows:

In 1880.....	300,000
" 1890.....	410,000

The advance will probably be more, as we shall presently see it has been in Philadelphia. But this is the very least; and this shows us that in about twenty-two years (a very short time in the growth of cities) the population of Cincinnati will be *doubled*; that is (putting it in a practical form to be understood), 220,000 people (all that are now in the city) will be added on, and must have houses, churches, streets, avenues, parks, &c. Where are they to be? Three-fourths of the new mass of people *must be north of the city*. Hence, the need of new avenues; but we have not come to that part of our argument. We now proceed to show that the growth of Cin-

cinnati will in all probability be much greater than what we have stated. In all cities there is a period when rapid growth for a short time ceases; and then if it has innate vigor it goes on with still greater strength and growth. Take New York, for example:

In 1810.....	96 000	Increase.
" 1820.....	123 703	30 per cent.
" 1830.....	202,589	70 "
" 1840.....	312,000	50 "

There is nothing in this to show the New York of 1,000,000 in 1870. From 1810 to 1840 (30 years), there were 216,000 added on; but (from 1840 to 1870) there were 700,000 people added on! But Philadelphia is an almost exact parallel to Cincinnati in its condition, industry and growth. Take this little table, in periods of ten years. Cincinnati from 1850, Philadelphia from 1820:

Philadelphia.	Cincinnati.
In 1820..... 112,000	In 1850 .....115,000
" 1830..... 161,000	" 1860 .....161,000
" 1840..... 220,000	" 1870.....218,000
" 1850..... 340,000	
" 1860..... 560,000	

The parallel is exact, and hence we may conclude that in twenty years Cincinnati will be much more than doubled. Philadelphia is a city, not of foreign commerce, but of manufactures, and so is Cincinnati; and coal and iron are the materials for the prosperity of both. Cincinnati, therefore, we conclude, *will be doubled in twenty years.*

2. In what directions will it be extended? If any of our readers happens to know any thing of the topography of Cincinnati and its environs, they know that the hills on which Mount Auburn, Walnut Hills and East Walnut Hills are situated, is an island, a geological island, which declines as much to the north as to the south; that is, at a distance of four miles due north or north-east from Fifth street market, you are as low as the upper plain of Cincinnati, or nearly so. On the north-east is the little valley of Deer creek, and on the north-west a branch of Mill creek, and there is in reality a valley on the north side of the hills, which extends from the Ohio to Mill creek. The result of this is, that if we suppose a tunnel finished through the northern hills, that it opens out on a fine plain country, but little higher than the upper plain of the city. Now, hearing this in mind, let us see how the city is extending. Already the city is crowning the heights of Mount Auburn and Walnut Hills. Two entire wards are there; no less than ten churches are there; schools are there; and in fine, Mount Auburn and Cincinnati are to be, not the northern skirts, but the very center of Cincinnati. Now suppose twenty years pass by, and 220,000 people put on the north side of Cincinnati, what happens? From the northern entrance of the tunnel there will be not suburbs but a part of the great city itself, extending north and east. If then the tunnel should be made,

and the railroad carry the outside citizens to their business for ten cents, as it can afford to do, then it will afford the great body of mechanics and operatives cheaper residences and cheaper living than can be had in Covington, Newport or any other quarter. It costs ten cents now to the resident in Columbia doing business in Cincinnati, but the tunnel route can compete with that, or with any possible route to the country. If, then, the tunnel route be completed, the growth of the city north will be still further increased. In fine, the tunnel at this moment affords the finest speculation, and the most certain mode of giving cheap homes to men of moderate means, which has yet been proposed in the history of Cincinnati.

The other heads of this subject we shall consider in another article.

East End against the West End.

We don't exactly see why these ends should be against each other at all, and think it the narrowest selfishness that will array the one against the other, or seek to improve the one and impoverish the other.

What our city needs is such general improvements as will make it better, safer, cleaner, healthier, more convenient, more beautiful than it is, so that it may grow in value and in population, and retain its right to be the Queen City of the West. And if there is a nuisance at the east end that can be removed, or converted into a business locality or a place of beauty, it ought to be done, and who dares to say that the *whole* city would not be benefited by it?

And so, too, of the west end. Any improvement wanted there that will promote the local and general welfare of the city, ought to be made. And it would be very much easier to make all these improvements, if this fair and reciprocal spirit prevailed than it is now that a bitter antagonism exists between these metropolitan extremities.

What possible interest can it be for one part of the city to grow and prosper, and another to languish? We would as soon think of palsyng one of our limbs or bodily members, or allow one of them to become atrophied by disuse, with the hopes and expectations that the counter limb or member would be strengthened thereby, as to carry out this silly war between the parts of the body politic of our city.

The question is not what wards have the largest number of people, the largest proportion of taxable property, but the good of the city as a unit, let it fall in whatever locality it may.

When this spirit prevails in our Councils, we shall be more prosperous, and shall be freed from the curses of jobs, and the wasting of the people's substance upon valueless work.

The Railroad Bill.

The railroad Bill now before the Ohio Senate, that proposes to allow one Railroad Company to appropriate (steal) the track of another such company passing through any city or village of the State, provides: That, if these companies can not agree upon the terms of such uses, that these tracks *may be appropriated*, and the enjoyment thereof by the several companies shall be determined by the common council of the city or village such track or tracks may pass through.

We have not the bill before us, but these provisions are in it. In plain English this means, first, that if one Railroad Company owns a valuable track or entrance into or through any city or village of the State that it may have originally paid largely to secure, and rendered very valuable by the constant expenses it may have put upon it or its surroundings, or in concentrating other lines of road to that locality, and the utmost capacity of which may be required for its own business, another and perhaps a rival company may quietly step in and appropriate (steal) a share of these privileges and advantages, to the injury of the real owners, and to the prejudice of their obligations to other companies, and for all these, merely pay a sum of money that may be assessed by a jury, obtained, and influenced, and ignorant, and prejudiced, as juries sometimes are.

And second, that the control of this part of the company's road shall be taken directly away from it, and subject to that of a set of men who may, and probably would in many instances, be elected by all the corrupt means known to our local politics, for the express purpose of favoring one of these corporations at the expense of the others. A set of men who know nothing of the wants nor necessities of these roads, and who by their blunderings and trickery would do an incalculable injury to these corporations and the public.

There is no use in saying these things would not occur, that it is intended to be fair, and will be honest, and all this sort of worn-out clap trap. Every man who knows any thing about such matters, knows that such opportunities as are offered in this bill for fraud and corruption are invariably taken advantage of, and work the greatest kind of mischief and that continually.

If there were no other reasons why this bill should be damned and kicked out of the Legislature, these are sufficient. It was conceived in corporate sin, and had better never be brought into life, than to be born in legislative iniquity.

Out with it. It is unworthy a moment's consideration.

This obnoxious bill was defeated in the Ohio Senate yesterday, after the above was in type.

Personal.

We received a most satisfactory visit from Mr. W. W. Taylor, the State Engineer of Georgia, whose headquarters are at Atlanta.

Mr. Taylor gave us a great deal of valuable information about public improvements in the South, and particularly in the State of Georgia. He tells us that the people of the South are alive to the importance of railways as a means of developing the resources of their country, and attracting capital and settlers thither; and are willing to do all in their power to aid these valuable works. He also informs us that the narrow or 30 inch gauge road is meeting with a great deal of favor in the South, and is likely to be generally adopted for lateral lines.

We are pleased to find so scientific and practical an engineer as Mr. Taylor approving the "narrow gauge," and recommending it to the people of his State. It is just the thing for them. Adapted to their country, within their means to construct, and of sufficient capacity for the business of any section of the country such roads are likely to be constructed through.

The South is the great field of this continent for the "narrow gauge railway." We hope to learn, within the coming year, that several of these contemplated lines are completed, and proving that all the Record has claimed for the narrow gauge is *true*.

We were gratified last week with a call from our old personal friend, Col. W. P. Hurlbert, of Georgia. Most of our citizens will remember the Colonel as the companion of Gov. Bullock and others, when in attendance at our "Cincinnati Southern Railway" meetings at the Board of Trade rooms, as delegates representing the interests of Georgia. Col. H. has been connected with the railroad and transportation interests of the South for the past thirty years, and is perhaps more conversant with its wants and necessities, as well as its resources than any other man. He says that they will adopt the narrow gauge (30 inches) for all lateral and local roads in Georgia, as best suited to their wants and adapted to their means to construct.

Notice.

On and after the 20th of this month, all persons having stock of the Dayton & Cincinnati Railroad Company, or claims against it, can have the same adjusted according to the terms of the capitalization of said company, matured April 11, 1871, by applying at the company's office, 167 Walnut street, Cincinnati, O.

A. J. HODDER, President.

G. B. ELLARD, Sec'y.

The Trade with Asia.

"In front of San Francisco (say rather, opposite the Pacific Coast) are 745,000,000 of hungry Asiatics who have spices, tea, coffee, drugs and dyes, to exchange for meat and grain."—Gov. GILPIN, of Colorado.

The rise or fall of cities has accompanied the acquisition or loss of the trade of Southern Asia. The possession of Chinese works of taste and utility by the ancient Assyrians and Egyptians shows that at the farthest reach of historic time the trade was established between Mesopotamia and Egypt, in the West, and "far Cathay," in the East. The Arabs sailed their craft by the Chinese "way marker," the mariner's compass, many centuries before the Christian era, their *zoron* and *aphron*, South and North, marking the Chinese mode of giving preference to the South as the abode of light, heat and vitality.

That wonderful nation, the Phœnicians, prospered not so much through what they made or raised as what they bought, carried, and sold. The tin mines of the Cassiterides (Scilly) were not too far beyond the pillars of Hercules, the region of fogs, and, presumably, of darkness and desolation; the tin mines of Malacca, and the spice lands of the Eastern Archipelago, were not too far in the East. The 27th chapter of the prophecy of Ezekiel is the best picture on record of merchant Tyrus. "Situate at the entry of the sea (the Mediterranean) a merchant of the people for many isles." Her shipping was "fir trees of Sennir," with "cedars of Lebanon to make masts," and oars made of the oaks of Bashan. At Tarshish, near the site of the present Cadiz—were "the multitude of all riches, with silver, iron, tin, and lead," collected from their Atlantic and Baltic stations. Arabia yielded her flocks, Sheba her spices, precious stones, and gold; Asshur her apparel and manufactures in wood, Egypt her fine linen with brodered work, Togarmah horses and mules, Didan ivory and ebony, Judah honey, oil and balm, Damascus the wine of Hebron (Aleppo) and white wool, Javan and Dan bright iron, (steel) cassia, and calamus.

Solomon traded with Hiram of Tyre, giving corn, wine, and oil for skilled work and manufactures. The copper of Syria and the tin of Britain united to make the bronze for the laver and other vessels of the Jewish Temple. Fired by an ambition to obtain a part of the Oriental trade, Solomon built Baelbek and Tadmor of the wilderness, the Palmyra of Zenobia, and at a later period, the success of Solomon in directing trade may have been the cause of the invasion of Pharaoh Shishak, who pillaged Jerusalem and the Temple, seven years after the death of the man whose wise laws and wives were equally numerous.

"And thus he played his part."

Petra, also, was the creation of the Oriental trade, and still stands, hewn from the solid

rock and proof against decay; but the solitude of these cities is only relieved by the occasional encampment of an Arab sheik or the visit of a Christian traveler. It is many long years since the commerce of the East passed through Idumea "to Ezion-geber and Eloth" on the Red Sea.

Tyre, by its success, provoked the jealousy of the great nations of its day. Nebuchadnezzar determined to root it out and destroyed literal Tyre so that Mesopotamia might predominate. Alexander, two centuries afterward, destroyed insular Tyre in order that Greece might become a maritime power.

Syria and Egypt struggled for some centuries for the possession of the wooded country of Lebanon and Bashan, as the only resort for timber to build ships for the Oriental trade. Rome destroyed Carthage that she might have no maritime rival, and so the merchant princess followed the fate of her queenly mother who was bewailed by the mariners: "What city is like Tyrus, like the destroyed in the midst of the sea? When the waves went forth out of the seas, thou filledst many people, thou didst enrich the kings of the earth with the multitude of thy riches and of thy merchandise." Ez. xxvii, 33-4.

As the trade shifted, cities rose and fell; the caravans of the merchant made the wilderness to blossom, and again the majestic piles of masonry were left for the owls and the bats. No such massive masonry as that of Baelbek is found in any other part of the world; the columns of Palmyra

"Stand sublime,
Flying their shadows from on high,
Like dials which the wizard Time
Has raised to count his ages by."

Antioch was for a time the second city of the Roman Empire. Aleppo once had 300,000 inhabitants.

In 1600 A. D. the spot now known as Ormuz, on the Persian Gulf route, was a barren rock, but a few years of permanent occupation of the spot as a free port, changed the barren islet into one of the wealthiest cities of the world.

Near the close of the 15th century Christopher Colon sailed west to find India, and named the nations of the new Continent. He thought he was upon the outposts of the great land which had long been so toilfully reached by the Eastern routes, and he died without discovering his mistake.

From the profits of the Asiatic trade proud Venice rose "from dirt and sea-weed." For this, Vasco di Gama circumnavigated Africa, as the Phœnicians had done more than twenty centuries before, in the time of Pharaoh Necho, and recorded by Herodotus.

Genoa took a share.

Holland traded close and worked the sweat of the Indies into spices, which she converted into her image of God—specie. She is still carrying on her heartless work at a heavy profit in cash. Did Great Britain so grind

India, the revenue from Hindoostan would pay the interest on her national debt, and all other national annual expenses.

The British, of course, are working hard for the direct route to Hindoostan, and by the improvement of the Persian Gulf and Mesopotamia route expect to revive the glory of many fallen cities of the middle ages. "Ormuz, Antioch, Aleppo, Cyprus, and Rhodes have a second history before them; Crete, Brindisi, Venice and Genoa will each obtain a renewal of their ancient fame." So says an English traveler. He very forcibly adds: "Alexander of Macedon was the first man who took a scientific view of the importance of the Persian Gulf route, but we have hitherto drawn but little profit from the lesson contained in his commission to Nearchus to survey the coast from the Indus to the Euphrates."

We are not so immediately interested in the British possessions in India, as in the still greater and more populous regions which face us on the other side of our Pacific ocean. Our own look-out upon the Pacific may be called 20° of latitude, say from 35° to 50°, counting in British Columbia as we are going ahead together. The Chinese and Japanese have a reach of say from 22° to 45°. India is only reached by a long detour around the Peninsula of Malacca which reaches almost to the equator. *

The Cincinnati & Mackinaw Railroad.

The notice in our columns for the sale of this road seems to have attracted the attention of quite a number of railroad men in different parts of the country. The fifth letter of inquiry about the condition and value of this work is now before us. We have taken great pains to answer all our friends fully upon this subject, and if there are any others who desire similar information we shall be pleased to give it to them.

Some of these parties are pecuniarily strong enough to make short work of this project, and at the rate it is offered there is no such speculation in all this part of the country.

THE HEMPHIELD RAILROAD SOLD TO THE BALTIMORE AND OHIO RAILROAD—At the sale of the Hemphield Railroad, in Philadelphia, on Thursday the road was purchased by John King, Vice-President of the Baltimore and Ohio Railroad Company, the price being \$131,000. The *Wheeling Register* says:

Though not unexpected, our citizens will be glad to receive this news. It gives promise of renewed life and vigor to the Hemphield, and additional trade to the city. This will make a link in the new through line from East to West via the Pittsburg and Connellsville Railroad. Now let our citizens offer liberal inducements to the Baltimore and Ohio Railroad for them to establish their shops here, and the transfer of the Hemphield to the Baltimore and Ohio road will be one of the greatest that ever happened to wheeling.

Charter of the Southern Pacific Railroad Company.

AN ACT to incorporate the Texas Pacific Railroad Company, and to aid in the construction of its road, and for other purposes.

SECTION 1.—*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That John C. Fremont, James L. Alcorn, G. M. Dodge, O. C. French, John D. Caldwell, J. J. Noah, A. C. Osborne, Timothy Hurley, C. C. Pool, Silas N. Martin, John M. Corse, George E. Wentworth, Philip H. Morgan, J. D. Camernn, Marshall O. Roberts, James L. Hodges, John Ray, W. Vermilye, Enoch L. Faucher, Charles F. Livermore, Joseph H. Oglesby, John Whytock, Daniel Drew, F. S. Davis, W. Orton, A. C. Babcock, Thomas A. Scott, Samuel D. Hoffman, H. Ramsdale, William H. Jackson, R. C. Parsons, Delos W. Emmons, M. A. Southworth, John H. Hall, G. C. Kinzey, W. P. Clark, James Dart, H. Jacobs, L. T. Smith, W. P. Dole, C. A. Weed, A. P. K. Safford, H. McCullough, Charles Jackson, Elisha Dyer, Alfred Anthony, James Hoy, M. W. Benjamin, H. D. Cooke, Joseph R. West, W. S. Huntington, J. M. Tebbetts, C. C. Leondrige, D. D. Porter, M. Woodbull, Hiram Price, M. C. Hunter, W. T. Walters, J. B. Brownlow, T. A. Morris, Owen Tuller, J. H. Ledlie, R. M. Bishop, Samuel Craighead, D. N. Stanton, Augustus H. Whiting, G. L. Johnson, J. W. Goodland, Powell Clayton, Samuel Tate, W. Bolton, H. Robinson, George Maney, O. H. Bynum, M. Burns, J. C. Goodloe, E. G. Barney, Cyrus Busey, J. W. Forney, J. Lockwood, E. M. Davis, N. Patton, W. Flanagan, G. O'Brien, G. P. Buel, G. H. Gidding, J. J. Newell, E. W. Rice, R. M. Shoemaker, Samuel Sloan, S. W. Morton, J. B. Bowman, L. M. Flournoy, J. J. Hinds, G. R. Weeks, J. T. Ludling, B. C. Gilbert, B. D. Williams, Thomas Olcott, G. A. Fosdick, Harry Hays, P. S. Forbes, John T. Sprague, L. R. Marsh, A. W. Beckwith, J. C. Stanton, Cyrus H. Baldwin, A. J. Hamilton, Rush R. Sloan, Silas C. Colgrove, Samuel D. Jones, N. H. Decker, William N. Leet, B. F. Allen, J. B. Chaves, Augustus Kountze, John N. Goodwin, William S. Rosecrans, Michael Hahn, H. C. Warmouth, J. S. Williams, G. M. Spencer, L. J. Highy, W. C. Kimball, and all such persons as shall or may be associated with them, and their successors, are hereby created a body politic and corporate in fact and in law, by the name, style, and title of the Texas Pacific Railroad Company, and by that name shall have perpetual succession, and shall be able to sue and be sued, plead and be impleaded, defend and be defended, in all courts of law and equity within the United States, and may make and use a common seal; and the said corporation is hereby authorized and empowered to lay out, locate, construct, furnish, maintain and enjoy a continuous railroad and telegraph line, with the appurtenances, from a point at or near Marshall, county of Harrison, State of Texas; thence by the most direct and eligible route, to be determined by said company, near the thirty-second parallel of north latitude, to a point at or near El Paso; thence by the most direct and eligible route, to be selected by said company, through New Mexico and Arizona, to a point on the Rio Colorado, at or near the south-eastern boundary of the State of California; thence by the most direct eligible route to San Diego, California, to ship's channel, in the bay of San Diego, in the State of California, pursuing in the location thereof,

as near as may be, the thirty-second parallel of north latitude, and is hereby vested with all the powers, privileges, and immunities necessary to carry into effect the purposes of this act.

SEC. 2. That the persons named in the first section of this act shall constitute a board of commissioners, (twenty of whom shall constitute a quorum for the transaction of business), to be known as the Texas Pacific Railroad commissioners, who shall meet in the city of New York, within ninety days after the passage of this act, at a time to be designated in a notice to be signed by the person first named in the list of incorporators and six of his associates, and to be published for two weeks in, at least, one daily newspaper in New York, New Orleans, and Washington; and, when so met, they may cause books to be opened for the subscription of the capital stock of said company, and when twenty thousand shares, amounting to two millions of dollars, shall have been subscribed, and ten per centum actually paid thereon, in money, to the treasurer to be elected by said commissioners, who shall give bond for its safe keeping and payment to the treasurer of the company when organized, then it shall be lawful for such subscribers or stockholders, or a majority thereof, to organize said company in accordance with the provisions of this act, and to elect not less than seven, nor more than seventeen directors, a majority of whom shall be necessary to the transaction of business, and shall hold their office for one year and until their successors shall be elected and qualified; and the said directors shall immediately proceed to elect a President, Vice-President, Secretary and Treasurer; the President and Vice-President shall be directors. At all elections for directors, each share of stock shall be entitled to one vote, which may be given by the holders in person, or by proxy, who shall also be a shareholder. The directors shall hold their offices for any term not exceeding three years, as may be provided in the by-laws; and the annual meetings of stockholders shall take place as provided for in said by-laws.

SEC. 3. That the capital stock of the Texas Pacific Railroad Company shall be fixed by the board of directors, at a sum not exceeding fifty millions of dollars, in shares of one hundred dollars; and when the amount is so fixed, it shall never be increased except by consent of Congress. Assessments upon said stock shall only be made by a majority vote of the whole number of directors at a regular meeting, which said assessments shall be paid at the expiration of thirty days after a notice given in one newspaper in each of the cities of Washington, Philadelphia, New York, and New Orleans.

SEC. 4. That the said Texas Pacific Railroad Company shall have power and lawful authority to purchase the stock, land grants, franchises, and appurtenances of, and consolidate upon such terms as may be agreed upon between the parties, with any railroad company or companies heretofore chartered by congressional, State, or territorial authority, on the route prescribed in the first section of this act; but no such consolidation shall be with any competing through line of railroads to the Pacific Ocean.

SEC. 5. That the said company shall have power and authority to make running arrangements with any railroad company or companies heretofore chartered, or that may hereafter be chartered by congressional, State, or territorial authority; also to purchase lands, or to accept donations, or grant of lands, or other

property, from States or individuals, for the purpose of aiding in carrying out the objects of this company.

SEC. 6. That the rights, lands, land grants, franchises, privileges, and appurtenances, and property of every description, belonging to each of the consolidated or purchased railroad company or companies, as herein provided, shall vest in and become absolutely the property of the Texas Pacific Railroad Company: *Provided*, That in all contracts made and entered into by said company with any and all other railroad company or companies, to perfect such aforesaid consolidation or purchase, the indebtedness or other legal obligations of said company or companies shall be assumed by the said Texas Pacific Railroad Company as may be agreed upon, and no such consolidation or purchase shall impair any lien which may exist on any of the railroads so consolidated or purchased; but said company shall not assume the debts or obligations of any company with which it may consolidate or purchase as aforesaid, to an amount greater than the cash value of the assets received from the same.

SEC. 7. That the said Texas Pacific Railroad Company shall have power to make and enforce rules and by-laws for the election of its officers and the government and management of the business of the company, and to do and perform all needful and proper things to be done and performed to promote the objects of the company hereby incorporated, not inconsistent with the laws of the United States and the provisions of this charter.

SEC. 8. That the right of way through the public lands be, and the same is hereby, granted to the said company for the construction of the said railroad and telegraph line, and the right, power, and authority is hereby given to said company to take from the public lands adjacent to the line of said road, earth, stone, timber, and other materials for the construction thereof. Said right of way is granted to said company to the extent of two hundred feet in width on each side of said railroad where it may pass over the public lands; and there is also hereby granted to said company grounds for stations, buildings, workshops, wharves, switches, side-tracks, turn-tables, water-stations, and such other structures as may be necessary for said railroad, not exceeding forty acres of land at any one point.

SEC. 9. That for the purpose of aiding in the construction of the railroad and telegraph line herein provided for, there is hereby granted to the said Texas Pacific Railroad Company, its successors and assigns, every alternate section of public land, not mineral, designated by odd numbers, to the amount of twenty alternate sections per mile, on each side of said railroad line, as such line may be adopted by said company, through the Territories of the United States, and ten alternate sections of land per mile on each side of said railroad in California, where the same shall not have been sold, reserved, or otherwise disposed of by the United States, and to which a preemption or homestead claim may not have attached at the time the line of said road is definitely fixed. In case any of said lands shall have been sold, reserved, occupied, or pre-empted, or otherwise disposed of, other lands shall be selected in lieu thereof by said company, under the direction of the Secretary of the Interior, in alternate sections, and designated by odd numbers, not more than ten miles beyond the limits of said alternate sections first above named, and not including the reserved numbers. If in the too near approach of the said

railroad line to the boundary of Mexico, the number of sections of land to which the company is entitled can not be selected immediately on the line of said railroad or in lieu of mineral lands excluded from this grant, a like quantity of unoccupied and unappropriated agricultural lands, in odd numbered sections nearest the line of said railroad may be selected as above provided; and the word "mineral," where it occurs in this act, shall not be held to include iron or coal: *Provided however*, That no public lands are hereby granted within the State of California further than twenty miles on each side of said road, except to make up deficiencies as aforesaid, and then not to exceed twenty miles from the lands originally granted. The term "ships channel," as used in this bill, shall not be construed as conveying any greater right to said company to the water-front of San Diego bay than it may acquire by gift, grant, purchase, or otherwise, except the right of way, as herein granted: *And provided further*, That all such lands so granted by this section to said company, which shall not be sold, or otherwise disposed of, as provided in this act, within three years after the completion of the entire road, shall be subject to settlement and pre-emption like other lands, at a price to be fixed by and paid to said company, not exceeding an average of two dollars and fifty cents per acre for all the lands herein granted.

Sec. 10. That when the route of said railroad and telegraph line shall pass through the lands of private persons, or where it may be necessary for said railroad company to take any lands belonging to private persons for any of the purposes herein mentioned necessary to said road, such right of way through or title to such lands shall be secured in accordance with the laws of the State or Territory in which they may be situated.

Sec. 11. That the Texas Pacific Railroad Company shall have power and authority to issue two kinds of bonds, secured by mortgage, namely: First, construction bonds; second, land bonds. Construction bonds shall be secured by mortgage, first, on all or any portion of the franchises, road-bed, or track of said railroad, and all the appurtenances thereto belonging, when constructed or in the course of construction, from a point at or near Marshall, to ship's channel, in the bay of San Diego, in the State of California, as aforesaid. Land bonds shall be secured by mortgage, first, on all or any portion of the lands hereby granted in aid of the construction of said railroad as is provided for in this act; second, on lands acquired by any arrangement or purchase or terms of consolidation with any railroad company or companies to whom grants of lands may have been made, or may hereafter be made, by any congressional, State, or territorial authority, or who may have purchased the same previous to any such arrangement or consolidation: *Provided*, That all the mortgages made and executed by said railroad company shall be filed and recorded in the Department of the Interior, which shall be a sufficient evidence of their legal execution, and shall confer all the rights and property of said company as therein expressed: *And provided also*, That the proceeds of the sales of the aforesaid construction and land bonds shall be applied only in the construction, operation, and equipment of the contemplated railroad line: *And provided further*, That said mortgage shall in no wise impair or affect any lien existing on the property of said company or companies at or before the time of such consolidation.

Sec. 12. That whenever the said company shall complete the first and each succeeding section of twenty consecutive miles of said railroad, and put it in running order as a first-class road in all its appointments, it shall be the duty of the Secretary of the Interior to cause patents to be issued conveying to said company the number of sections of land opposite to and coterminous with said completed road to which it shall be entitled for each section so completed. Said company, within two years after the passage of this act, shall designate the general route of its said road, as near as may be, and shall file a map of the same in the Department of the Interior; and when the map is so filed, the Secretary of the Interior, immediately thereafter, shall cause the lands within forty miles on each side of said designated route within the Territories, and twenty miles within the State of California, to be withdrawn from pre-emption, private entry, and sale: *Provided, however*, That the provisions of the act of September, eighteen hundred and forty-one, granting pre-emption rights, and the acts amendatory thereof, and of the act entitled "An act to secure homesteads to actual settlers on the public domain, approved May twenty, eighteen hundred and sixty-two, and the amendments thereto, shall be, and the same are hereby extended to all other lands of the United States on the line of said road, when surveyed, except those hereby granted to said company.

Sec. 13. That the president of the company shall annually, by the first day of July, make a report and file it with the Secretary of the Interior, which report shall be under oath, exhibiting the financial situation of the company, the amount of money received and expended, and the number of miles of road constructed each year; and further, the names and residences of the stockholders, of the directors, and of all other officers of the company, the amount of stock subscribed, and the amount thereof actually paid in, a description of the lines of road surveyed and fixed upon for construction, the amount received from passengers and for freight, respectively, on the road, a statement of the expenses of said road and its fixtures, and a true statement of the indebtedness of said company and the various kinds thereof.

Sec. 14. That the certificates of the capital stock must be signed by the president and secretary, and attested by the seal of the company, and shall contain an extract from the proceedings of the board of directors fixing the amount thereof, as well as from this act, authorizing such issue. All the bonds and mortgages issued by said company must be signed by the president and secretary, and attested by the seal of said company, and shall contain an extract from the law authorizing them to be issued. The face value of said bonds shall be one thousand dollars in gold, and shall be redeemable at such times, and to bear such rate of interest, payable semi annually in gold, as may be determined by the directors. The total value of the construction bonds to be issued shall not exceed thirty thousand dollars per mile of said railroad, and the total face value of the land bonds shall not exceed two dollars and fifty cents per acre for all lands mortgaged; the total amount of each to be determined by the board of directors.

Sec. 15. That all railroads constructed, or that may be hereafter constructed, to intersect said Texas Pacific Railroad, shall have a right to connect with that line; that no discrimination as regards charges for freight or passengers, or in any other matter, shall be

made by said Texas Pacific Railroad Company, against any of the said connecting roads; but that the same charges per mile as to passengers, and per ton per mile as to freight, passing from the said Texas Pacific railroad over any of said connecting roads, or passing from any of said connecting roads over any part of said Texas Pacific railroad, shall be made by said company as they make for freight and passengers over their own road: *Provided also*, That said connecting roads shall reciprocate said right of connection and equality of charges with said Texas Pacific railroad: *And provided further*, That the rates charged for carrying passengers and freight, per mile, shall not exceed the prices which may be fixed by Congress for carrying passengers and freight on the Union Pacific and Central Pacific railroads.

Sec. 16. That said road shall be constructed of iron or steel rails manufactured from American ore, except such as may have heretofore been contracted for by any railroad company which may be purchased or consolidated with by the company hereby incorporated, as provided by this act.

Sec. 17. That the said Texas Pacific Railroad Company shall commence the construction of its road simultaneously at San Diego, in the State of California, and from a point at or near Marshall, Texas, as hereinbefore described, and so prosecute the same as to have at least 50 consecutive miles of railroad from each of said points complete and in running order within two years after the passage of this act; and to so continue to construct each year thereafter a sufficient number of miles to secure the completion of the whole line from the aforesaid point on the eastern boundary of the State of Texas to the bay of San Diego, in the State of California, as aforesaid, within ten years after the passage of this act; and upon failure to so complete it, Congress may adopt such measures as it may deem necessary and proper to secure its speedy completion.

Sec. 18. That the President of the United States, upon the completion of the first section of twenty miles, shall appoint one commissioner, whose duty it shall be to examine the various sections of twenty miles as they shall be completed, and report thereon to him in writing; and if, from such report he be satisfied that said company has fully completed each section of its road, as in this act provided, he shall direct the Secretary of the Interior to issue patents to said company for the lands it is entitled to under this act, as fast as each section of said road is completed.

Sec. 19. That the Texas Pacific Railroad Company shall be, and it is hereby declared to be, a military and post road; and for the purpose of insuring the carrying the mails, troops, munitions of war, supplies, and stores of the United States, no act of the company nor any law of any State or Territory shall impede, delay, or prevent the said company from performing its obligations to the United States in that regard: *Provided*, That said road shall be subject to the use of the United States for postal, military, and all other governmental services, at fair and reasonable rates of compensation, not to exceed the price paid by private parties for the same kind of service, and the government shall at all times have the preference in the use of the same for the purpose aforesaid.

Sec. 20. That it shall not be lawful for any of the directors, either in their individual capacity or as members of an incorporated or joint stock company, to make any contracts or agreements with the said Texas Pa-

cific Railroad Company for the construction, equipment, or running of its road, or to have any interest therein; and all such contracts or agreements are hereby declared null and void, and all money or property received under such contracts or agreements may be recovered back for the benefit of the company by any stockholder.

SEC. 21. That any railroad company whose route lies across the route of the Texas Pacific railroad may cross the same, and for the purpose of crossing shall have the right to acquire at the double minimum price all lands, whether of the United States or granted by this act, which shall be needed for a right of way two hundred feet wide through said lands, and for depots, stations, side tracks, and other needful purposes, not exceeding for such purposes forty acres at any one station.

SEC. 22. That the New Orleans, Baton Rouge & Vicksburg Railroad Company, chartered by the State of Louisiana, shall have the right to connect by the most eligible route to be selected by said company with the said Texas Pacific railroad at its eastern terminus, and shall have the right of way through the public land to the same extent granted here by to the said Texas Pacific Railroad Company; and in aid of its construction from New Orleans to Baton Rouge, thence by the way of Alexandria, in said State, to connect with the said Texas Pacific Railroad Company at its eastern terminus, there is hereby granted to said company, its successors and assigns, the same number of alternate sections of public lands per mile, in the State of Louisiana, as are by this act granted in the State of California, to said Texas Pacific Railroad Company; and said lands shall be withdrawn from market, selected, and patents issued therefor, and opened for settlement and pre-emption, upon the same terms and in the same manner and time as is provided for and required from said Texas Pacific Railroad Company, within said State of California: *Provided*, That said company shall complete the whole of said road within five years from the passage of this act.

SEC. 23. That for the purpose of connecting the Texas Pacific railroad with the city of San Francisco, the Southern Pacific Railroad Company of California is hereby authorized (subject to the laws of California) to construct a line of railroad from a point at or near Tehachapa pass, by way of Los Angeles, to the Texas Pacific railroad at or near the Colorado river, with the same rights, grants, and privileges, and subject to the same limitations, restrictions, and conditions as were granted to said Southern Pacific Railroad Company of California, by the act of July twenty-seven, eighteen hundred and sixty-six: *Provided, however*, That this section shall in no way affect or impair the rights, present or prospective, of the Atlantic & Pacific Railroad Company or any other railroad company.

Approved, March 3, 1871.

LACQUERINO VARNISH.—A varnish recommended as well adapted for lacquering pictures and engravings, as well as for preserving dried plants and flowers, is prepared by pounding up ten ounces of gum sandarac, four ounces of mastic and half an ounce of camphor, and adding three quarts of strong alcohol. The mass is to be frequently shaken up, and finally placed in a warm situation until it settles. Plaats coated with this varnish will, it is said, be protected from destruction by insects, and will retain their colors fresh and unchanged. This varnish does not peel off, and therefore can be applied very thin.

A New Pacific Railroad.

Some interest has been excited in Wall street by the announcement of the Canadian Inter-oceanic Railroad. Encouraged by the growing prosperity and rapid success of our Pacific Railroad connecting the Atlantic sea-board with San Francisco and the Orient, some British capitalists long ago projected a line to pass from sea to sea through British territory, from Halifax to Vancouver's Island. The scheme has been in abeyance; but on Wednesday, at Ottawa, Sir George E. Cartier, on the part of the Canadian Government, proposed in the House of Commons that any company undertaking the construction of the road shall be aided with \$1,500,000 a year. This new Pacific Railroad enterprise having thus been formally adopted by the Government of the Dominion, doubtless with the sanction of the Imperial Government at home, it only requires that a dividend of 5 per cent. a year should be guaranteed on the whole capital; and 130 millions of dollars which the road will cost could doubtless be easily raised in England. To this guarantee there is considerable opposition by the advocates of light taxation; and the subject has further complications by being connected with the rather unpopular measures for the immediate admission of British Columbia as an integral part of the Canadian Confederation. In the unsatisfactory state of the finances of the Dominion the opposition is very active, but its success is doubtful.

The railway will be 2,500 miles long. It is to be begun in 1873 and finished by 1881. The work is to go on simultaneously at both ends. By the new route British Columbia is to be connected with the Canadian railways by a road which will give England a short path to India and China over her own territory and subject to her exclusive control.

The route has not been fully surveyed as yet; but its general direction is along the 50th parallel, our Southern Pacific road taking the 32d parallel, the Northern Pacific the 46th, and our Great Central Pacific route the 41st parallel. The new Canada Pacific is to start from Bute Inlet, opposite Vancouver's Island, and to terminate at Lake Nipigon, to the north-west of Lake Superior. At Bute Inlet the harbor accommodations are very good. Crossing the Cascade mountains at the Tete Jannée pass, at a low elevation, the new road is to descend in easy grades down the gradual slope of the Saskatchewan Valley to Manitoba. This is the district formerly known as Prince Rupert's land, surrendered by the Hudson's Bay Company last year, but not at once confederated with the Dominion. The population in 1869 of the whole territory comprised in British Columbia and Manitoba was reported at 28,465 persons. Their total commerce in 1865 was £228,591, in 1866 £202,448, in 1867 £111,796, in 1868 £112,699, in 1869 £152,926. In 1870 the commerce was about £280,000, while the population is estimated at 45,000. It is easy to see that in such a sparse undeveloped region the local traffic for years to come must be extremely small. Much reliance is placed on the large land grant, and the income therefrom will be considerable, though in so high a latitude the temptation to emigrants will be much less than in our own sunnier and more inviting lands. The through traffic, as experience shows, will yield very small net earnings toward paying the guaranteed 5 per cent. on the outlay. As the road will therefore be a dead weight on the Canadian Treasury of six and a half millions of dollars a year, at least, it is not difficult to see

the ground of the vehement opposition the scheme is meeting from a few economists in the Canadian legislature.

There are rumors, however, that the Imperial Treasury will in some way interpose, and the railroads of British India show that England is prepared to make great sacrifices to secure in any contingency a free development and an uncontrolled communication for her oriental customers and her Indian possessions. As a great military road the British Pacific offers advantages which can not be over estimated for the consolidation and unification of the Colonies. At present our Central Pacific road offers the only swift route through an English speaking country to the ports of the western coasts of this Continent: while the Panama railroad offers similar facilities to the ports of South America. The Asiatic ports of Russia, the newly opened ports of Japan and China, the Sandwich Islands, the Spice Islands, New Zealand and Australia, are all developing a new active trade with this country and with Europe. Still the through freight will cost heavily on this long English railroad, and will seek other less costly and established routes. Travel and express freight may, perhaps, be attracted from the better known routes to the new British road. But it is uncertain. There is every reason to believe that the ten years in which this road is to be finished will make New York the undisputed master of European, and San Francisco of Asiatic communication over this Continent.

Moreover, England will find the Suez route to India, whether by railroad or canal, both cheaper and quicker than her proposed Inter-oceanic Railway. The Cape of Good Hope route will be cheaper, if not quicker. From England to China the time by way of Suez may be less, but the cost higher. To Japan and New Zealand the route over some parts of this Continent will be much the quickest as also to the Pacific ports, from Sitka in the north to Valparaiso in the south. But before this road is opened, travel will become so accustomed to move in our channels of transportation as to be loath to leave them. "Trade loves its old grooves," as we are told, and we should not have attracted to our new American routes so much of the through traffic with the Orient, but for the disturbance of the old routes of travel by the gold discoveries, the Crimean war, the Indian mutiny, the troubles in Egypt, the Suez Canal, the Mont Cenis summit and tunnel railways, the wars and rumors of war in Continental Europe, and finally by the disturbance of the old Marseilles line of packet steamers and their transfer to Brindisi on the Adriatic, whence steamers can find a much shorter line of voyage to Alexandria than from Marseilles. So great a revolution has not had its analogy in the changes of the grand routes of commerce since the taking of Constantinople by the Turks and the discovery of the Cape of Good Hope by Vasco Di Gama. Our Pacific Railroad was not constructed a year too soon to enable it to attract over our territory the rich Oriental commerce thus disturbed from its old channels. When the quietude has been re-established and trade has become established in its settled grooves, it will not be so responsive to new impulses or susceptible of new directions.—*The Chronicle*.

—The following figures serve to show the magnitude of railway traffic in England and Scotland: On sixteen of the leading lines of road there are, 7,925 locomotives, 17,646 passenger cars, 135,990 freight cars, 8,575 cattle cars, and 73,750 coal cars.

Narrow Gauge Railways.

The contest between the advocates of the broad gauge and narrow gauge railways has been definitely settled by experience in favor of the latter. There are but few engineers, and those certainly not of the highest order of intelligence, that are bold enough to advocate Mr. Isambard Brunel's theory of the advantages of the extreme broad or seven feet gauge. He had followers with influence enough in this country to lead to the construction of a few six-feet gauge roads, of which the Erie Railway is a good type, and their history from first to last has been one of disaster mechanically, and therefore financially. Competitive experience has definitely settled all questions in favor of the narrow or 4 feet 8½ inch gauge for the great trunk or back-bone lines. One by one the broad gauge lines are being reduced in width, both here and abroad, and in a few years they will all have disappeared, and will be remembered only as ambitious failures. We have at all times been strenuously in favor of identity throughout this country, and have advocated the 4 feet 8½ inch as the one that ought to be adopted, and we still have a good degree of confidence that it will finally be so for the great connecting lines of travel; that the 4 feet 9 inch, the 4 feet 10 inch, the 5 feet, 5 feet 6 inch, and all other exceptional gauges, will finally be merged into one harmonious system of really connecting railways. There is no need of discussing the advantages of such a result, both to the public and the owners of railway property. But while the great mass of railway managers and engineers have been striving to bring railways of this country into the narrow or prevailing gauge, it has been practically demonstrated that extreme narrow gauge lines, from 4 feet 9 inch to 3 feet 6 inch in width are capable of giving a large degree of accommodation both for passenger and freight traffic, and that the decreased cost of construction is so considerable that these may be built in certain sections, with hope of profit, where it would be impossible to sustain a road with the prevailing gauge. The success of these extreme narrow gauge lines is indisputable, and as they are beneficial to sparsely settled communities for local accommodation, and for feeders for the main lines of travel, it is well that they be brought into harmonious relations with these, and so systematized that they shall be in harmony with each other. It would be an act of extreme folly to repeat the mistake which has been so fully shown by "break of gauges" in the general system; and therefore, to avoid such complications, the width of these feeding or spur lines should be settled by legislative enactment. The Railway Committee of the State of Massachusetts have had this matter under consideration, and have made an interesting report, in which the general subject is discussed with great ability and fairness by the chairman, Mr. George A. Parker, the well known and eminent civil engineer, who has evidently given the matter a good deal of attention. The practicability of interpolating a narrow gauge system is fairly discussed, and the questions of cost of construction alluded to as well as the comparative cost of operation; and the report finally closes with a bill authorizing the construction of roads with three feet gauge in this State. We copy below that portion of the report in which the question of the first cost of the narrow and the prevailing gauge is compared, and shall hereafter print such portions of the report as will more immediately interest our readers:—

Let us estimate the cost of building and equipping one mile of a cheap railway, 25 miles long of 2 feet 9 inch gauge, where the average depth of cuttings and embankments may be reckoned at four feet. The sectional dimensions, and the bridging, masonry and sidings being deduced and averaged from a surveyed line, and the equipment conformed as nearly as practicable to the recommendations of the India committee and of practical builders in this country, the prices being actually guaranteed by the latter, viz:

Rails.....	\$4,243 00
Sleepers.....	352 00
Spikes.....	175 00
Joint fastenings.....	400 00
Laying track.....	250 00
Embankment, 6,062 cubic yards.....	1,513 00
Cuttings, 5,629 cubic yards.....	1,480 00
Rock cutting, 1,611 cubic yards.....	1,611 00
Ballast.....	1,000 00
Sidings.....	200 00
Masonry and bridges.....	1,140 00

Rolling stock for whole road say:

Engines, 3.....	\$18,000 00
Passenger cars, 5...	5 500 00
Mail & bag. cars, 2...	1,200 00
Merch'dise cars, 35.	6,125 00
" " 25.	4,000 00

\$34,825 00 ÷ 25 = 1,393 00

\$13,757 00

And the estimate of cost of same road with similar grades and alignment, with a gauge of four feet eight and one-half inches, with the usual provision for rolling stock, viz:

Rails.....	\$6,600 00
Sleepers.....	924 00
Spikes.....	264 00
Joint fastenings.....	700 00
Laying track.....	325 00
Embankment, 8,604 cubic yards.....	2,151 00
Cutting, 11,703 cubic yards.....	1,627 00
Rock cutting, 2,085 cubic yards.....	2,085 00
Ballast.....	2,000 00
Sidings.....	334 00
Masonry and bridges.....	2,000 00

Rolling stock for whole road, say:

Engines, 3.....	\$18,000 00
Passenger cars, 5...	20,000 00
Mail & bag. cars, 2...	2 600 00
Merch'dise cars, 30.	30,000 00
" " 20.	16,000 00

\$116,600 00 ÷ 25 = 4,664 00

\$23,974 00

The difference is nearly that of nine to two, and shows that where cheap roads is practicable, the use of the narrow gauge may reduce the cost about one-half, without reducing necessary efficiency.—*American Railway Times.*

SINGLE-RAIL TRAMWAY IN ENGLAND.—A new form of single-rail tramway has lately been introduced in India, with a satisfactory result. The vehicles used, in addition to the ordinary wheels, have a pair of flanged wheels, one behind the other, running on the single rail, which is laid at the center of the track. The flanged wheel are adjusted by a screw, so as to take all the weight off the ordinary wheels without lifting them from the roadway. An experimental line has been laid, in part, at an incline of 1 in 40, and along this a pair of bullocks draw a load of three tons. The advantages are—first a very great diminution of power expended in hauling, as compared with traction on common roads; secondly, that the cost of construction is only one-half that of an ordinary tramway with two lines of rails.

The Cincinnati and Newport Bridge.

As Congress has decided that this bridge must be elevated so as to give more clearance for the passage of steamboats, it will be necessary to change the approaches at the Cincinnati end, in order that the grade may not be too steep, and we have been informed that the following plan is under contemplation by the railroad companies who are directly interested in the completion of the structure:

It is proposed to complete the Deer Creek Tunnel, which has been abandoned for a dozen years or more, and to carry the track down Eggleson avenue, and from thence on to the bridge by an easy grade.

If we remember rightly, this tunnel is twenty-nine feet in the clear, and will afford ample room for three tracks, thus making it one of the most desirable routes for running trains into the city, as there will be no danger of horses becoming scared by the locomotives, and the cars can be run at the highest speed as soon as they enter the tunnel.

The advantage of this route will be apparent when it is remembered that most if not all of the railroads which center here are compelled to run a number of miles through some of the most contracted and thronged streets before they can reach the corporate limits of the city. This is not only a great source of danger to the citizens, but it is also an annoyance to the railroad companies who are compelled by the city ordinances to run their trains at a very slow speed while passing through the streets.

Another great advantage peculiar to the tunnel route would be the facility it would afford of supplying the city with fuel—a consideration of the first magnitude in a large manufacturing center like Cincinnati.

Cars can be filled at the mines, the trains run through the tunnel, and the coal emptied into yards in Deer Creek valley without any extra handling whatever; the cars to be employed for this purpose being provided with doors in the bottoms, which, when opened, will deposit the coal wherever desired. If our memory serve, one mining company, at the time this tunnel was first projected, proffered to deliver coal at eight cents per bushel.

We consider this one of the most desirable improvements that could be suggested for the benefit of this city, and feel confident that if the proper amount of energy and nitro-glycerin be applied to the tunnel it will go through.—*Industrial Press.*

VALUE OF IRON PRODUCTS OF CINCINNATI.—To show the great value and rapid increase of manufactures of metals in Cincinnati, we have collected the following tabular statement from reliable data:

	Value of Iron Products.	Other Metals.
In 1840.....	\$ 1,728,549	\$1,058,040
" 1850.....	4,143,900	1,209,190
" 1860.....	5,305,606	1,464,738
" 1869.....	17,068,628	2,820,086

Adding some other lines of metal Manufacture, and we have about \$20,000,000 as the product of 1869, an increase of over 200 per cent. since 1860. We should call that not only a fair increase but a very rapid one.

The Nevada State Journal says: The Rocky Mountain coal trade is beginning to be quite an item in the way of freight, at least. Scarcely a freight train from the east passes through here but has from five to twenty cars loaded with coal. Evanston, on the Union Pacific Railroad, 26 miles east of Ogden, is the place from whence the coal is shipped, and is mostly consigned to San Francisco dealers.

KENTUCKY AID TO RAILROADS.—D. Howard Smith, Auditor of Kentucky, has compiled a complete list of the railroads aided by the different counties and towns of the State, giving the amount of aid pledged by every place. The aid as distributed among the railroads was as follows:

Bardstown and Louisville.....	\$60,000
Cumberland and Ohio.....	2,200,000
Covington and Lexington.....	672,000
Danville and McMinnville.....	300,000
Evansville, Henderson and Nashville.....	679,000
Elizabethtown and Paducah.....	2,698,000
Glasgow Branch.....	125,000
Jeffersonville.....	167,000
Louisville, Harrodsburg and Virginia.....	300,000
Louisville and Nashville.....	2,115,300
Lebanon Branch.....	568,000
Lexington and Big Sandy.....	584,000
Lexington and Danville.....	218,000
Maysville and Lexington, and Lexington and Covington.....	94,000
Maysville and Lexington.....	387,333
Maysville and Lexington, and Maysville and Sandy.....	240,000
Madisonville and Shawneetown Straight Line.....	105,000
Nashville and Northwestern.....	27,000
New Orleans and Ohio.....	300,000
Owensboro and Guthrie.....	400,000
Owensboro and Russellville.....	947,350
Richmond Branch.....	717,000
St. Louis Air Line.....	500,000
Shelbyville.....	540,000
Total.....	\$14,933,983

—The Pittsburg and Connellsville Railroad was finally completed April 10, giving Pittsburg a direct connection with Baltimore. This company has for years been struggling under heavy disadvantages pecuniary and legal. Five years ago, rival interests were brought to bear against the company, which seemed almost friendless, and an act passed the Pennsylvania Legislature forfeiting its charter for abuse and misuse of its corporate franchise. The passage of this act was a crisis in the history of the road, the forfeiture of its charter being considered oppressive, and stirred up the friends of the road to unceasing energy. After a long struggle, the nullifying act was repealed, and the company restored to its franchise, and the city of Baltimore and the Baltimore and Ohio road then took an active interest in its behalf, subscribing largely to its stock, and through the active co-operation of President Garrett, of the Baltimore and Ohio road, its early completion was assured. Since that time President W. O. Hughart has pushed the road with extraordinary vigor, and to-day, together with B. H. Latrobe, Chief Engineer and the former President, performed the duty of spiking the last rail at a point near Mineral Point. Immediately upon its completion, the first train proceeded to Cumberland, passing over a temporary road which had been constructed over Brook tunnel, which is not yet completed. The total length of the road from Pittsburg to Baltimore is three hundred and twenty-five miles; the highest grade fifty feet to a mile. Express trains, when running regularly, are expected to make the distance from Pittsburg to Washington in ten hours, via the Point of Rocks route. When completed, the road will have cost nine millions of dollars. Through passenger trains will commence running next Monday.

—The contract for the construction of a tunnel at Baltimore, connecting the Baltimore and Potomac Railroad with the Northern Central, has been awarded to Mr. Thomas Ritter, of Philadelphia. The tunnel will be 7,400 feet long, and cost over \$1,000,000.

—The St. Paul and Sioux City road will be completed by the end of this year.

THE RAILROAD GAZETTE, published in Chicago, by A. N. KELLOGG, is a Weekly Illustrated Journal of 21 pages, as large as those of *Every Saturday*.

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CHARLES A. DANA, Editor.

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Those living in localities remote from Banks, may send money, or other bonds, directly to us by express, and we will send back Northern Pacific Bonds at our own risk and without cost to the investor. For further information, pamphlets, maps, etc., call on or address the undersigned, or any of the Banks or Bankers employed to sell this Loan.

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CINCINNATI, OHIO.

RECEIVER'S SALE.

Jacob T. Maritz, Receiver of the Cincinnati and Mackinaw Railroad Company, plaintiff,

vs.

The Road Bed, &c., of said Railroad Company.

The State of Ohio, Darke County Common Pleas, No. 3,280.

By virtue of an alias order of sale made by the Court of Common Pleas, within and for the county of Darke, and State of Ohio, at the June Term, A. D. 1868, of said Court, in the above entitled case, and to me, as Receiver, appointed by said Court, of the said Cincinnati and Mackinaw Railroad Company, issued and directed, I will sell at public outcry, at the door of the Court-house, in Greenville, in said County of Darke, on

SATURDAY, MAY 6, 1871,

at the hour of 2 o'clock, P. M., of said day, the following described property, rights, franchises, &c., of the said Cincinnati and Mackinaw Railroad Company, situate and being in the counties of Darke, Mercer, and Van Wert, in said State of Ohio, to-wit: The Road Bed and right of way of the said Cincinnati and Mackinaw Railroad Company for a railroad, commencing at a point near Greenville, in Darke County, aforesaid, and extending through the counties of Darke, Mercer, and Van Wert to the town of Van Wert, in said last named county, in the State of Ohio, including the bridges, fixtures and culverts, railroad ties on the same, or intended for the said road, together with the right of way owned and held by said Company for the construction of its said road, together with all the rights and franchises of said Company for the construction of and maintaining its road in the said State of Ohio, together with all other property real and personal, belonging to said Company, in said State of Ohio, intended to be used in the construction of its said road.

Appraised at Seventeen Thousand Dollars.

Terms of Sale, Cash.

W. A. WESTON,

Receiver, Cin. & Mack. R.R. Co.

C. CALKINS, Attorney; March 23, 1871.

23-3-70, St.

The Railroad Record.

E. D. MANSFIELD, - - - - - } Editors
T. WRIGHTSON, - - - - - }
A. J. HODDER, - - - - - }

CINCINNATI, - THURSDAY, APRIL 20, 1871

The Railroad Record,

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The Tunnel.

THE NEED OF IT TO CINCINNATI.

In our last article on this subject, we discussed the two propositions of: 1. At what rate Cincinnati will grow; and 2. In what directions. We found that both the conditions and the growth of Cincinnati are almost precisely parallel with those of Philadelphia. Cincinnati is exactly thirty years behind Philadelphia; and taking the later thirty years back, we find the growth of both *pari passu*, side by side. This comparison shows some things most encouraging to Cincinnati, for the conditions are so parallel that we have no reason to doubt that the next twenty years of growth will be fully equal to the twenty years of growth in Philadelphia from 1840 to 1860. What was that? As follows:

In 1840.....	220,000
" 1850.....	340,000
" 1860.....	560,000

The increase of population in Philadelphia from 1840 to 1860 was 340,000; and there is no doubt that of Cincinnati in twenty years will be equal to it, *provided* Cincinnati takes the same means to develop its own growth and resources. Why not? The growth of Philadelphia in that twenty years grew out of the application of capital to two objects: 1. The development of coal and iron; 2. The development of all possible railroads and facilities of transportation which could bring anything to Philadelphia. Doing those two things has made Philadelphia what she is. Will Cincinnati do the same? This brings us to our third question: What *facilities* and *means* does Cincinnati need to furnish in order that she should thus grow? Let us see.

1. She requires to make the Southern road, because that road will be in regard to Cincinnati precisely what the turnpikes, canals and railroads were to Philadelphia, connecting her through Pittsburg with the West. In spite of New York and Baltimore, Philadelphia really did the largest part of the western business, and to this day does a large part of it. If Cincinnati had a direct railroad to the South, which would connect directly with Augusta, Savannah, Charleston and Wilmington, she would command *four-fifths of the whole Southern trade*. But Kentucky has refused the right of way; Congress delays action, and really we do not see that the Southern Railroad is any nearer completion than it was thirty years ago. We are profoundly sorry for this, but the truth must be spoken. Well, suppose we lose the Southern road; what next?

2. Cincinnati, like Philadelphia, requires to have coal and iron cheap and abundant. This is the very condition of her existence as a manufacturing city. How is she to develop the iron and coal interests? She is to provide facilities and encourage railroads, which can bring those essential elements of prosperity into the city *cheap*. That is the required condition. Now take for example the following case: The Cincinnati & Wilmington Railroad begins at Morrow (Warren Co.), and ends at Zanesville. That is, it has no independence of its own. It must be tributary to some other line. It has been bought up by the Pennsylvania company, who are making a little branch to connect it with the Pittsburg road at Dresden. All this is very well for a passenger route, but what does it do to develop coal and iron? Nothing. Well, let us now imagine what *might* be done. We have described in these columns the immense value and extent of the Sunday creek coal mines. Now let the Wilmington road from New Lexington (a point on that road) be finished to the "great vein" in Sunday creek valley, and from Morrow into Cincinnati, through the tunnel on to the upper plain of Cincinnati; then let the road be supplied with the oval iron coal cars, with the coal dumped into them at the mines and dumped out of them at the coal yard, and coal can be retailed in Cincinnati at 10 cents a bushel, and the road make more profit than the boats make on the river. But how is it now? There is not a coal road into Cincinnati; not one that has the means and facilities of carrying coal cheaply. What is the result? The consumers of coal in Cincinnati pay a million of dollars more per annum than they need to do. Of all the roads into Cincinnati, the Wilmington road is the best calculated to make a coal road; first, because if continued to Sunday creek it will penetrate by far the best coal mines; but also because, being untrammelled by other roads, it can be carried through the tunnel without embarrassment. The Penn-

sylvania company have, we believe, either bought it or leased it, but that is only so much stronger reason why it should be completed. The Pennsylvania company are able to do it, and they can engage in nothing more profitable. And now we come to the next thing required.

3. Cincinnati *needs* the Tunnel, and needs it greatly. It was very natural that the first railroads should seek to enter Cincinnati by Mill creek valley. It was apparently much cheaper (although in the long run it has proved much the dearest), and the little valley apparently offered the most local traffic. This was, we say, natural; and yet, in some respects, delusive. But the route has some great and serious defects, which can not be remedied. In the first place, it was roundabout. If we suppose the Tunnel to be an actual fact, and take some point (such as Sharon) 10 or 12 miles out, and then take a central point on the upper plain of Cincinnati, the connecting line between the two points will be nearly two miles shorter through the Tunnel, and can be run much quicker. Then, supposing a depot on the upper plain at the termination of the tunnel route, the *distribution* of passengers and freight will be easier and cheaper. But again there is another and great reason for the completion of the Tunnel, which is intimately connected with the comfort, convenience and economy of the future of Cincinnati. We have already shown that in the next twenty years there must be added to this city 220,000 people. After allowing fully for those who may go east and west on the Ohio, and for those who may go up Mill creek valley, 100,000 of these people must settle on and north of Mount Auburn and Walnut Hills. Of these again full 50,000 will live north of the hills, in some villages or suburbs, from Sharon to Cincinnati. How are they to be reached? There is no possible way conceivable by which they can be reached so well and so cheaply as by the Tunnel. And here let me observe that it is of the utmost importance that great cities should provide cheap and comfortable homes for its working people. If such homes can not be got, the best parts of the mechanics and workmen must emigrate. The progress of a city can not be aided in any way so well as to make living cheap and comfortable to work people. This is an element of city success. In the heart of a city this end can not be attained. The Tunnel enterprise will embrace this feature. The desideratum of Cincinnati at this time is one, two or more village towns, laid off so conveniently, and with houses and lots furnished so cheaply and so comfortably that workmen can afford them, and have no inducement to live in the close parts of the city. The Tunnel, therefore, will bring health, comfort and economy to the suburban residents, and there is nothing else can do it. On the basis that the tunnel will be made, we shall in another number demonstrate the great profits of such an enterprise to its shareholders.

Texas Pacific Railroad.

The corporators of the Southern or Texas Pacific Railroad met in New York on Saturday last, subscribed the amount of stock, and paid in the sum required by the recently granted congressional charter, and took the steps necessary for a complete organization of the company.

It was surprising to see with what avidity the stock was sought for. When the basis of the subscriptions were agreed upon, names were written and cash paid almost fast enough to make an ordinary man's head swim.

Marshall O. Roberts subscribed for \$1,100,000, and planked on the table one hundred and ten one thousand dollar bills. John C. Fremont was allowed to subscribe for \$500,000, for which a check was given by his friends for \$50,000. This left but \$400,000 to be divided among the rest of the corporators, each being allowed to take \$5,500, and the necessary \$550 each were soon piled up in the hands of the treasurer, Sam. Sloan, Esq.

A general good feeling prevailed, although there were some who were a little disappointed at not being allowed to take more stock, and a few who were disgusted and refused to take any. Among the former was the president of one of our Ohio roads terminating near Sandusky, who made a great time about it; although he had never turned a wheel in favor of the enterprise, or spent a copper or a "bait of breath" to procure the franchise. Among the latter we noticed the cadaverous features of a Boston operator, well known in Alabama. We understood, however, that he afterwards sorely repented, and tried to retrieve his error, but it was too late.

We understood that there were several parties who were willing and desirous to assume the responsibilities that were taken by Mr. Roberts, waiting in the ante-room, and with the cash in their pockets. This we know to have been the case; and hence argue that the congressional charter, published in our last week's issue, offers something tempting to capitalists.

It was understood that Hon. T. A. Scott, of the Pennsylvania Railroad, and who was present at the meeting, was the full equal partner of Marshall O. Roberts in his venture. This is a sure guarantee of the speedy completion of the road, and the financial success of the enterprise.

The present corporation will combine in its possession the benefits of all existing franchises, both State and National. Hence, there will be no conflicting interests. This would not have been attained under any other management than that of Mr. Roberts; and therefore the present organization is the very best that could have been made for the enterprise, and is an additional guarantee of perfect success.

The Chesapeake & Ohio Railway.

Again, and for about the twentieth time at least within a year, there is a slight stir in our city about the Ohio extension of this road. What it will amount to is quite uncertain, though if we should base our judgment upon prior movements in the same direction, we should simply say "nothing." We hope for better things, however, as the time draws rapidly near when something must be done if at all.

Just ten months ago, one of the editors of this paper made a visit to Virginia and to the work upon the Chesapeake road in that State. He then wrote that within a year the work would be so far completed towards the Ohio river, that we ought to be in an advanced state with the extended line to our city, and ought therefore to go to work at once.


There was a little flurry upon the subject then as now, but it was less than a nine days' wonder, and relapsed again into the old accustomed indifference.

The present movement is upon the river route. Soon we shall have signs of life again upon what is known as the inland route. And when that is the case, the Hillsboro route, the only one that kept continuously in the land of the living, will stir again.

In some instances a little well-timed friction between conflicting interests of this sort is productive of good results. But as this city will doubtless be called upon for her share of aid to these lines, and it must necessarily be a large share, it is doubtless best that this aid shall not be rendered insignificant and valueless by division. All three of these lines will not be made, hence there ought to be a full consideration, and that as soon as possible, of the relative merits of these routes, and the best one selected, and upon that one all our efforts concentrated.

We believe surveys have been made of them all, and that the necessary data for such a conclusion is at hand. If not, let such measures be inaugurated at once as will secure it in the shortest possible time, and then let the proper parties decide the route, and upon that go to work with a right good will that shall ride down all obstacles and lead to success.

What is our Board of Trade doing in this matter? Had it not better organize a movement to this end? Let it lead off, there will be plenty of followers.

 The Lake Tahoe Water Company propose to tunnel the Sierra Nevada five miles to bring water two hundred miles to San Francisco, and deliver the city twenty million of gallons daily for fifty years, in return for six million six per cent. thirty-year bonds, to be delivered on the completion of the work, no payment before. The Board of Supervisors passed a resolution of acceptance. Colonel A. W. Von Schmidt is at the head of the work, which will commence in May, and is expected to be completed in four years.

The Paul Brothers.

One of these gentlemen made our sanctum a short visit on Monday last, and posted us up generally upon the progress of the narrow gauge railway movements throughout the country.

We were pleased to learn that our sanguine expressions about the success of the narrow gauge is already more than realized, and that the more roads built of this style, and the more experiments made with them but develops capabilities greater than their most ardent advocates have claimed for them.

The Paul brothers, three in number, and all thoroughly educated and practical engineers early espoused the narrow gauge in America, and have become famous as being *au fait* in all that relates to it. They have made this subject a specialty, and are, doubtless, the best posted engineers to be found in the country in all that relates to the new railway track.

The brother who visited us was *en route* for Georgia, where he goes at the instance of Eastern capitalists who are interested in the construction of the system of such roads being planned throughout that State, and, indeed, we may say throughout the entire South.

Mr. Paul promises us an original article occasionally upon his specialty, which, we are sure our readers will await as anxiously as we do.

The Dayton, Stillwater Valley & Saginaw Railroad.

A friend of ours, just from Dayton, dropped into our office to-day, as he says, just to inform us that on Monday last a trifle over \$12,000 was subscribed by Dayton citizens to the capital stock of the above named road, and that this is but one of several installments of nearly equal amounts that will be taken in other parts of the city.

He also informs us that heavy subscriptions are being made to this road all along its line, and that the gentlemen leading in the scheme assert most positively that the road will be made, and that too, much sooner than is expected by outsiders. This is most gratifying intelligence.

The Cincinnati & Mackinaw Railroad.

We understand that a committee from Greenville, Ohio, were in this city on Tuesday last on business connected with the Cincinnati and Mackinaw road. Their object was to ascertain what connections can be had with the road leading from Eaton into this city.

Our reporter did not ascertain whether their mission resulted in all that was desired or not. We hope so however, but if not, we can assure these gentlemen there is no need for discouragement upon that head, as when the time comes, such connections, or perhaps better ones, can be easily obtained.

SHORT LINE.

Dayton and the Short Line.

[Correspondence of the R. R. Record]

DAYTON, OHIO, April 17, 1871.

I was very sorry to notice in the columns of my "old reliable" newspaper so ill-natured and savage an article on Mr. Odlin's railroad bill as appeared in the last number. The writer of the article surely could not have understood the situation when he talks about thieves, stealing the property of others, etc.; he is simply talking for effect, for such a thing as *pay* is out of the question with such men as have heretofore conducted the Record.

The question is a very simple one. Years ago the city gave permission for certain railways to lay tracks through Sixth, Shawnee, Cooper, and other streets, and to that extent, that our city is encircled by railways, and one can scarcely drive in any direction from the center of the city without having to cross one or more railway tracks. The nuisance is almost intolerable. Now another railway asks the independent right of way over the very tracks it is now using by permission of another company. This the city granted on condition that the other road shall be fully and amply compensated. This is all there is of it. If this is stealing, your people have a very delicate sense of that offense. But how about the "stealings" of the road you so earnestly defend? From Cincinnati to the depot in Dayton is fifty-nine miles. The law allows the road to charge three and a half cents per mile, or \$2.06½ for the trip; yet, for years past, that very honorable and much abused corporation, whose property is about being filched from it, has charged \$2.15, or eight and a half cents more on every through passenger, than the law allowed them. Now they charge \$2.10, or three and a half cents extra. This has amounted to many thousands of dollars, and yet none of the keen-sighted writers of the press seem to have discovered it. No doubt, if they had, we should have heard of it (in a horn) long ago.

Now, Messrs. Editors, please put yourselves right on this question. The people of Dayton have no desire to wrong the C, H. & D., or to appropriate their property. They simply want to prevent other streets from being destroyed by railway tracks while the streets already used for that purpose are ample to accommodate all the roads that may wish to pass through here for years to come. The question, in a nut-shell, is whether the C, H. & D. shall enjoy a monopoly of the trade of Miami and Mad River Valleys, or share it with another that has as good a right to it as the C, H. & D. Yours, truly, D.

EDITORIAL REMARKS: We take great pleasure in doing whatever of justice that may be in our power to the parties interested in the

new Dayton Short Line enterprise. We have never intended to do them a wrong. If, however, there has not been more *chenaneganry* on the part of the leaders in this movement, and if had it not "come out every time" just as the Record had previously said it would, exactly contrary to the high promises made, then might we possibly have some confidence in the integrity of the present movement. We confess to having had but little, and we have not been alone in this opinion. This, however, has nothing to do with the merits of the present question.

The question is, has the Legislature the right to grant the power to one railroad, a creature of the law, to override the rights of another co-equal creature of the same law? And, if that principle, as stated by our correspondent, should be carried out as to a part of the track of the C, H. & D. why not condemn the right to use the entire road? thus avoiding the necessity of constructing the new?

Would not this be creating a new form of corporation "huggery," hitherto unrecognized by the statutes, or in the annals of crime, and to which the epithets objected to by our correspondent are tame and unmeaning. Whoever heard of one co-equal overriding another of the same genus, without a distinction of sex. The idea is not only preposterous, but monstrous.

Is there not something else besides the convenience of the citizens of Dayton, to be gained by the passage of this law? Will not the "Short Line" save at least "half a million" by the operation? It is a very strange doctrine of equity that would force a railroad to furnish the facilities for its projected rival to destroy its own business, even if, as suggested, compensation is tendered.

There is another point which we observe in an article from a Dayton correspondent using the same signature as the one above, and evidently from the same pen, published in the *Gazette* of the 19th inst., which destroys his entire argument, and obviates the necessity for the passage of the bill. The sentence is as follows:

"The C, H. & D. has no vested right in these streets any more than anybody else. It is simply there by consent of the city of Dayton, which has the right to give the same privilege to others if it sees fit."

Now if this is true why apply to the Legislature at all? Certainly the Courts can give the asked for relief.

But the truth is, "D" is in error; the wily manipulators of "Short Line" have made use of the warm feelings, and ardent desires of our Dayton friends, and enlisted all their sympathies to enable them to perpetrate a wrong, by the passage of a general bill, on which there can be no limit, and through which innumerable outrages *might* be perpetrated in every city and village in the State.

Let us ask "D" another question: By

what route is this Short Line to enter Cincinnati? By the C, H. & D., by the new Cincinnati & Baltimore, by the Little Miami, or by the "Tunnel," that we are informed has recently been assured to be constructed at an early day? This same bill will enable them to condemn an entrance over any of the above, and may do the same thing at every town and hamlet between here and Dayton, even if it could not by the authority of this bill condemn the use of the whole track!

In reference to the sins of the C, H. & D. in relation to over-charges for passenger traffic, we remark that we are not their confessor, and our correspondent and the public have a proper remedy at law. We shall certainly not undertake their defense.

The garrulous imputations in the following from the *Gazette* article, already quoted from, are certainly beneath contempt, and the writer but does himself injustice. He says:

"It is not to be at all presumed that the *inco*g. scribblers of these paragraphs are in any way influenced in their opinions—as it has been asserted by a leading journal was the case, in manufacturing public opinion in favor of certain water-works—namely, \$100 greenbacks! Oh, no. * * *

"You may depend upon it, Mr. Editor, that the opposition to this bill is of the same stripe as that which opposes your Southern Railway, high bridge, cheap gas, etc., etc. I am sorry, therefore, to see a paper that I have confidence in countenance any such opposition, even negatively, by lending its columns for the abuse of those who are endeavoring to protect their own interests without wronging any one."

The silent imputation of our motives at the close of our correspondent's first paragraph is equally unfounded, unjust, and unworthy of recognition. We will, however, casually remark that we are perhaps under fewer obligations to the C, H. & D. than to any other road leading into the city.

In regard to the causes that breed the opposition to our "Southern Railway" in Kentucky, our correspondent evidently knows so little, that did he know less he very clearly would know nothing.

It Might Have Been Prevented.

"Near Red Bank, on the Little Miami Railroad, yesterday, a covered wagon was dashed to pieces by a train, on a crossing. The horse was killed, and the driver badly injured, having an arm and several ribs broken in addition to injuries to his face and body."—*Commercial*, April 19th.

The electric alarm would have prevented this accident, and without half the cost that will probably be required to fix this matter up, to say nothing of saving all the suffering and probably the life of this poor man, etc.

When will corporations become wise? The old adage of "penny wise and pound foolish" over again.

Great Britain has 160,000 miles of macadamized roads.


The Savannah Convention.


Our esteemed friend, Samuel Stevenson, the gentlemanly and efficient General Ticket Agent of the Cincinnati, Hamilton & Dayton Railroad, has returned from his trip to the South, whither he went to attend the Railroad Ticket Agents' Convention, recently held at Savannah, Georgia.

Mr. Stevenson informs us that the attendance at the Convention was large, and that its deliberations were characterized by harmony and good feeling.

There were but few changes made in the railway tariffs, and but little business of more than local significance transacted.

Mr. Stevenson says that the Savannah people were pleasant and quite sociable, and did all they could to make the delegates to the Convention comfortable. He saw nothing of the Ku-klux nor its attendant monsters, and is in every way quite pleased with his visit. The next Convention will be held at Philadelphia.

 Railroad travel is really a luxury when surrounded with the comforts and conveniences that are found in such cars as the Morning Star, the Jay Gould, the Jim Fisk, etc., on the Erie Railway. We have tried it and know what we are talking about. The real truth is, the management seem determined that the traveling public shall have their money's worth regardless of the cost in giving it to them. But then, they can afford it better than other roads that are eternally concerned about paying high dividends on their scrips and watered stocks.

 The Cincinnati Gazette of April 19th, 1871, in an able article upon "Cincinnati and its Future," says:

"A second class of improvements are those which facilitate and cheapen the comfortable living of mechanics and workingmen. This is a grand point. This can only be done by giving them houses, lots, markets and railroads cheap. How can you do this? Evidently by putting tens of thousands of the future people outside the city limits, in pleasant towns, built purposely for them, and carrying them for a minimum price. Mr. Stewart is building a town on Long Island for this purpose. The New Jersey Central Railroad does this, when it starts a train of cars from New York to Elizabeth and other country towns, every ten minutes, and carries them for a minimum price. From six to twelve miles north of Cincinnati can be had good sites for half a dozen such towns, and all that is wanted are facilities for getting to them. The avenues now making will help, and the city ought not to hesitate a moment in furnishing them; but they are not the only roads by any means. The street car lines must be run out on all the avenues. But this is not all. In some way the tunnel should be finished. We hear of street car elevators, &c., &c.; but it is plain that all the getting up and down hills in any way can not be as good as going straight through the hills, and hence it is that the tunnel road, if it be ever made, will be far the

best. The problem of extending Cincinnati is reduced to just this—of giving cheap houses and cheap living to the workmen. It can be done, and it ought to be an object, alike benevolent and patriotic to every man, who has acquired his wealth by the labor of others (and who has not?) to help the great mass of workmen to cheap homes and cheap living."

A BILL

To amend section four of the act, passed April 15th, 1857, entitled an act to amend the act entitled an act to provide for the creation and regulation of incorporated Companies in the State of Ohio, passed May 1st, 1852, and to regulate Railroad Companies.

SECTION 1.—*Be it enacted by the General Assembly of the State of Ohio, That section four of said amendatory act of April 15th, 1857, be so amended as to read as follows:*

"SEC. 4. When two or more railroad companies heretofore formed or hereafter formed under a general or special law, have laid down or shall hereafter lay down in the same street, public way, alley or opening, two or more tracks of the same gauge into or through any city or incorporated village, it shall and may be competent for the council of such city or incorporated village to require said railroad companies to use said railroad track in common, and to pass their locomotives and cars over each of said tracks only in one direction; and when such track shall have been laid, no street or streets running in the same general direction shall be granted or appropriated to the use of any other railroad company for like purposes, unless for controlling reasons of necessity or public convenience, the council shall otherwise determine and allow, but such other company desiring to use said tracks in common with the companies owning and controlling them, may acquire said use by agreement, or failing therein may appropriate the same, including the right of way, subject to such regulations for the enjoyment thereof by the several companies in common as the council may establish; provided, however, that the appropriation authorized as aforesaid, shall be made in the manner and upon the terms provided by law for appropriating private property to the use of corporations, except that in no case shall such appropriation be made until the council by resolution, shall first determine the same to be expedient; but the jury in assessing compensation to the companies owning said tracks, for the qualified use thereof sought to be appropriated, shall allow no greater sum than the whole valuation of said tracks with the right of way therefor, divided by the whole number of companies using the same, and thereafter the expenses of repairing, renewing and maintaining said tracks, shall be borne by the companies so interested in like proportion, unless they shall otherwise agree."


SEC. 2. That section four of said amendatory act, passed April 15th, 1857, be and the same is hereby repealed.

SEC. 3. This act shall take effect and be in force from and after its passage.

—The Joint Railroad Committee of the New York Legislature have reported on the New Hamburg disaster that the testimony is so conflicting that they can not make up a report meeting the approval of a majority of the committee, and therefore submit the testimony for such action as the Legislature may deem proper.

First Class Railways for Investment.

Railway managers and operators understand that the cost of railway operation is governed by the degree of perfection of the road and rolling stock. That is, the better the conditions the cheaper can the traffic be carried. This is reasonable enough, on the face of it, but how few managers seem to be governed by the fact which is so self-evident to any intelligent person who has had a moderate degree of experience. The fact that many railways with ill drained road-beds, with defective rails, and not the best designed rolling stock, still pay dividends, is no proof that that condition is not an evidence of the most wasteful extravagance, to call it by no harsher name. Leaving out the question of safety to passengers, and the certain expenses attending the want of it, the fact exists that the cost of carrying passengers and freight is very much less per mile and per ton where the management insists upon perfection in every detail of the permanent way and the rolling stock. Roads managed like the Pennsylvania, the Boston and Providence, and a dozen others we could name, are to-day carrying their traffic at a much less cost than those economically managed roads where the rails are out of level and plane, where the wheels pound out the joints, and the rolling stock groans and creaks with every motion of the wheels. The allowance of these peculiarities is always at the expense of future dividends. The new road that A. T. Stewart is now having built on Long Island is intended to test the question of the real value of a first class railway for fast passenger traffic at low prices. Everything about this road is to be first class in every respect, from the road-bed to the last detail of the rolling stock. Every practical improvement which experience in this country and Europe has shown to be valuable will be here applied, and when finished, at a cost of certainly not less than \$100,000 per mile, hourly and perhaps half-hourly trains will be run at from thirty or forty miles per hour for passengers at very low rates. The intelligent gentlemen who have this matter in charge are very confident that the enterprise will show favorable results, not only in building up a very large traffic, but a very valuable return upon the large investment. It will be a model road in many respects. As we have already stated, the rails will have puddled steel heads with iron flanges, 64 lbs. to the yard, 4½ inches high, and the joints secured by fish-plates. The locomotives and cars will have the Griggs Elastic Wheel, the Westinghouse brakes, and the Miller platforms, and some details of the track copied from foreign practice will be of a novel character. We understand, likewise, that Whitman's improved sleeper, which has met with favorable recognition on many New England roads, will here have an additional trial of its merits. When this road is in running condition we design to give a more full account of its details, and with others shall look forward to the results of its operation with the greatest interest. We think it will here be demonstrated that a first class railway, built with cash, and operated under intelligent supervision, can be made to pay a handsome return upon the cost, at greatly reduced prices for travel.—*American Railway Times.*

 The complete returns of the last census show the total population of the United States, territories, and District of Columbia to be 38,538,180, against 31,413,321 in 1860. Increase, 22.6 per cent.

Narrow Gauge Railroads.

THEIR CONSTRUCTION AND THEIR ADVANTAGES—
AN INTERVIEW WITH THE PAUL BROTHERS.

AKRON, OHIO, April 10, 1871.

MESSRS. EDITORS.—Your correspondent, knowing the interest that is felt regarding narrow gauge railroads, called, to-day, on the Paul Brothers, when the following conversation ensued:

"What is meant by a narrow gauge railroad?"

By narrow gauge railroads we wish to be understood as referring to those railroads having tracks with the rails placed nearer together than the ordinary distance of 4 feet 8½ inches, the gauge preferred being 3 feet, although there are circumstances where a different gauge might be recommended.

"Do you consider such railroads practicable for general freight and passenger traffic?"

We do, the question being whether they possess sufficient capacity and accommodations.

As far as the capacity of the road is concerned, we believe a narrow gauge railroad is capable of doing all the business usually required.

The accommodations for freight and passenger traffic depend to a certain extent upon the width and dimensions of the cars used.

For minerals, grain, or ordinary merchandise, there is no difficulty in using very small cars, and it is rarely that any freight is met with that the cars that could be run on a three feet gauge would not afford ample space, the principal question being the economy with which freight can be carried.

For passenger traffic, comfortable arrangements have been successfully secured on gauges as narrow as two feet, by the adoption of a different plan for seating the passengers.

"What is the comparative cost of construction and equipment?"

This depends upon the character and amount of traffic, but in general we think it should not exceed two-thirds of the cost of a road built upon the ordinary gauge.

It must be remembered, however, that from its adaptability to sharper curves, it may often be economically constructed and successfully operated where to build a road upon the ordinary gauge would be so expensive as to be out of the question. This would especially be the case in a hilly or mountainous region.

Again, where the traffic is light, and a low rate of speed would be sufficient, the cost may be much further reduced, and thus extend the benefit of cheap transportation by steam over iron rails to many sections of the country which otherwise could not hope for it. We have no doubt that such lines could be built in a moderately level country at from \$7,000 to \$10,000 per mile, and prove good investments for capitalists, and be more beneficial to the inhabitants in developing the resources of the country than lines on the ordinary gauge costing \$25,000 to \$30,000 per mile would be.

"What is the comparative cost of working?"

In Norway the two gauges, ordinary and narrow (the length of the latter being about 120 miles), have been worked under charge of the same government engineer, Carl Pihl, and under circumstances where the relative economy of working could be closely compared, and the working expenses of the narrow gauge were eight per cent. less.

A great saving in working expenses is effected by the larger proportion of paying loads that can be carried on the trains.

Take, for instance, one of the ordinary platform, or gondola cars, used for carrying coal. On the ordinary gauge they weigh eight tons, while the load they carry is ten tons, or ratio of dead weight to paying load is as eight to ten; while in the narrow gauge lines we have in operation in this country, the dead weight is only about one-third.

Any railroad man will readily understand the effect such a saving in a dead weight would have in the cost of working.

"What is the relative cost for maintenance and repairs?"

A very large part of the receipts of every railroad is immediately invested in keeping the roadway, structures and working machinery in order. Could we be able to materially reduce this expenditure, it would largely increase the per centage of net revenue.

We claim to be able to do this by the narrow gauge; the lighter engines and cars do not have so destructive an effect on the track or on themselves.

Any one who wishes to satisfy himself on this point can do so, here in Akron, by noticing how the heavy engines used on the ordinary gauge grind, crush, and break the rails, while the light equipment used on the narrow gauge roads has scarcely a perceptible effect.

"What are the drawbacks?"

The only disadvantage resulting from a narrow gauge that we consider worth our attention is the break of bulk or transshipment of goods that would be necessary at any point where it may meet with another railroad having a wider gauge.

But when we reflect that we have not yet attained a uniformity in this matter, and that gauges of 6 feet, 5 feet, 4 feet 10 inches, 4 feet 9 inches and 4 feet 8½ inches are still in common use, and that a difference of two or three inches has just as much effect as so many feet, it will be safe to say we can not be much worse off in this respect than many existing lines having the ordinary gauge.

But admitting that this drawback is as serious as some have claimed it to be, we can not consider that it will materially detract from the other striking advantages we have enumerated.

"What are the advantages?"

We consider that freight can be more cheaply transported on a narrow than on a wide gauge, and that this will hold good for a traffic as large as most of the roads in the country at present command.

For a light and purely local traffic, the advantage is beyond comparison in favor of the narrow gauge.

Many have made loud complaints, and even sought for legislative action in order to compel railroads to make no discrimination in favor of through traffic against local traffic. Undoubtedly much of this discrimination is unjust, and so far as it is so, we will not undertake to defend it; but it should be considered that the present system of heavy trains is not adapted to carrying small lots and varying loads of freight with the same economy of full trains, and thus we can have a partial explanation, at least, that, while the actual cost of transportation by rail is only one-tenth or one thirtieth what it is by wagon, it is rarely resorted to for short distances.

The light trains of the narrow gauge would be admirably adapted to carrying on such a traffic with profit to the stockholders, and affording facilities for transportation at a reasonable cost to the people along the line, and there are many parts of the country where such lines could be successfully introduced

and mainly supported by such a traffic, where an ordinary railroad would not only sink the capital invested in building it, but could only be worked at a loss.

In conclusion, we will enumerate the advantages of a narrow gauge line:

1. Practicability.
2. Saving in first cost.
3. Greater economy of working.
4. The smaller per centage of revenue required for maintenance and repairs.
5. Its especial adaptability to carry on a local traffic, thus increasing the amount of profitable business.—*Cincinnati Gazette.*

INJURIES TO PASSENGERS STANDING ON PLATFORMS—RULE AS TO FURNISHING SEATS—In a case soon to appear in the 51st vol. of Ills. Reports—the case of Quinn vs. Illinois Central Railroad Company—the following principles were laid down:

"One of a large funeral party, who took passage upon a train to go a distance of twelve miles, was standing upon the steps of the platform of one of the cars, bolding on to the railing, when the conductor came along collecting fare. In making change for a bank-note which the passenger paid for his fare, the wind carried away the paper as it was passing from the hand of the conductor to that of the passenger. The latter, in attempting to regain it, and as he was then standing on the edge of the platform, or on the steps, lost his foothold and fell against an embankment, was thrown back under the cars and killed. The cars were quite full but there was standing-room in all of them. In an action against the company, under the statute, to recover damages for the death of the deceased, it was held: it was the negligence of the deceased, not that of the company, which caused his death, and there could be no recovery.

"While it is negligence on the part of a railroad company, for which they should be held strictly accountable, not to furnish comfortable sitting accommodations for their ordinary number of passengers, or even for an extraordinary number, upon due notice, yet the same strictness should not apply when a train is unexpectedly crowded by a large party going only a few miles.

"And even if it was the duty of the conductor, in this case, to have advised the deceased to enter the car from the platform, at least while paying his fare, his failure to do so was as nothing when compared with the gross negligence of the deceased."

DETROIT RIVER TUNNEL.—It is given out by those reputed to be well informed, that the tunnel under the Detroit River, from Detroit to Windsor, will be commenced during the coming summer. The plan is to construct three tunnels, two of which are to be about sixteen feet in height, and running parallel to one another across, and uniting at one entrance and exit at each end. A third will be made of smaller dimensions, say five feet in diameter, to act as a main drain, and to be situated underneath and between the other two. The work will be commenced on the last named tunnel first, so that the drainage of the work may be effected as fast as they are carried on. Present appearances justify the surmise that this valuable engineering work will be completed in about two years.—*American Railway Times.*

The United States consumes 40,000,000 bushels of salt annually, or one bushel to each inhabitant.

Preserving Railway Ties.

While, in European countries, the preservation of railway ties is almost universal, there is still a great indifference in this country concerning this subject. It is true that the press has of late given greater attention to wood preservation; but while doing so, it has failed to point out those processes which alone have given satisfaction. In order to be generally applicable, the impregnating material, especially for railway ties, must be cheap and easily accessible. The machinery, while inexpensive, should be light, and so constructed as to be readily movable to the spot where the ties are to be treated; and finally, the saturating material ought to be of the best preserving qualities. But what is to be said when alleged preservatives, long ago rejected in Europe, are gravely offered to the American public, as has lately been done by the author of the *Practical Treatise on Soluble or Water Glass*, a book almost unanimously praised as a meritorious publication of technical literature? Indeed, in such instances, information is very much needed.

In order to afford protection against decay, the preparation employed should form an insoluble compound with the albumen of the sap; it should seal the pores against the entrance of putrescent matter; and the ligneous fibre should not be injuriously affected by its action. Among the many compounds proposed, there is not any one which will meet these requirements as well as the oil of creosote, or the heavy oil of coal-tar. Having proved a perfect preservative from decay in all instances when properly applied, this oil is now, with a very few exceptions, universally used on European railways. Ties properly creosoted have never been known to rot, even if exposed for over twenty-five years. The density of the wood is also greatly increased, and the ties acquire almost the density of oak.

Concerning the plans for impregnating wood, our remarks shall apply to the pressure process, the vapor process, and the method of Seely.

THE PRESSURE PROCESS.

The wood and liquid being contained in and nearly filling a closed and strong iron receptacle, more liquid is pumped in until a high pressure is attained, and the liquid is forced into the pores of the wood. The pressure required for the purpose approaches two hundred pounds, to the square inch, and the apparatus is consequently very heavy and expensive. Only well-seasoned and dry wood is suitable for this process, as it is evident that, if the pores of the wood be occupied with sap, no amount of simple pressure will so condense the sap as to permit the entrance of the preservative liquid. The great cost of setting up and working this process, and the fact that it can be effectively used for unseasoned lumber, have prevented its extensive introduction into the United States.

THE VAPOR PROCESS.

This process was first carried out on an extensive scale by Lucken, in 1811, and was revived in England by Frantz Moll, in 1835, and quite recently by several inventors in this country. This plan was proposed at a time when the value of antiseptics was over estimated, and when the necessity of sealing the pores of the ligneous tissue was overlooked. It was also supposed that, by simply exposing the wood to the vapor of coal-tar, a sufficient amount of the antiseptic would be carried into the pores to afford perfect protection. Leaving

out of the question the injury of the wood by the great heat (400° to 706° Fahrenheit) necessary to volatilize the products employed, it is evident, since the space occupied by creosote vapor is eleven hundred times that of the same weight of liquid creosote, no available amount can be got into the wood. And even if it should be completely permeated, no useful end will be attained, owing to the fact that vapor on condensation will leave the pores empty.

THE SEELY PROCESS.

The writer has already had occasion to call attention to this process, by which, within the past three years, large quantities of railroad timber have been successfully treated. Although one of the most recent processes, it has attained a high reputation, and is already spoken of as the only one fulfilling the requirements of scientific and practical investigation.

The process, in brief, consists in subjecting the wood to a temperature above the boiling point of water and below 300°, while immersed in a bath of creosote oil for a sufficient length of time to expel the moisture. When the water is thus expelled and the pores contain only steam, the hot oil is quickly replaced by a bath of cold oil, by means of which change the steam in the pores of the wood is condensed, and vacuum formed, into which the oil is forced by atmospheric pressure and capillary attraction. Among the advantages of this plan, the following may be named: The thorough air-drying which is required by the pressure process is obviated; the expulsion of the sap, and the amount of oil forced into the wood, is perfectly under the control of the operator—any desired fraction of the vacuum of the pores may be filled at pleasure. On examination with the microscope, of wood saturated by Seely's method of treatment, every pore was found completely filled with oil, and this not only on the surface, but also in the center of the piece examined.—*National Car-Builders*.

NARROW GAUGE RAILWAYS.—A civil engineer in Texas advocates the construction of narrow gauge railways with wooden rails as adapted to thinly populated districts in Texas, where traffic is light and it is utterly impossible to get money to construct ordinary roads. Charters have been obtained for two such roads, and they are likely to be built soon. A railway thirty inches wide and eleven miles long is to be built in Greene county, Tennessee, at a cost of \$20,000. The rails are of wood, and are to be stripped with iron. This is getting the cost of railways down to a pretty low figure. As the construction of these narrow gauge lines has got to be accepted as a "fixed fact" in all the States, it would be well for the different legislatures to pass laws designating the width, so that the narrow gauge system will be identical throughout. The railway committee of the Massachusetts Legislature has recommended a gauge of three feet, and doubtless this will receive the legislative sanction. It is to be hoped that other States will conform with this movement. The best engineering authorities in this country and in Europe are in favor of three feet for the narrow gauge railway system.—*American Railway Times*.

The expenses of our wars with Indians since the beginning of the century amount to more than \$400,000,000, while the amount of money spent in attempts to educate them has only been \$8,000,000.

RAILROADS IN MEXICO.—*Heraclitus's Railway Journal*, of December 31, 1870, gives a report of the meeting of the stockholders of the Mexican Railway Company. From the report read at the meeting it appears that there are 116 miles of railroad in running order from the city of Mexico to Puebla, which during the first ten months of 1870 earned \$545,330; the working expenses for the same period amounted to \$298,625, leaving \$246,705 as profit. The section of the road from Vera Cruz to Paso del Macho is 47 miles long, and during the first 9 months of 1870 earned \$143,205; the working expenses amounted to \$138,370, leaving only \$4,835 profit. Part of the sum charged to working expenses, however, was used in construction. The payments made by the Mexican government during the first 9 months of 1870 in aid of the extension of the road amounted to \$723,483. The company is now engaged in building another section of the road, from Paso del Macho to Fortin, a distance of 24 miles, requiring the construction of three iron bridges and two tunnels. The report says that the traffic is at present entirely local, and that until the remainder of the line is completed, through the difficult Maltrata pass, and along the plain country at the top, the commerce between Mexico and Vera Cruz will continue to be carried on along the very fine old road built in the time of the Spanish viceroys, which is still useful for all purposes. The work of completing the road will be very expensive. After passing Fortin there is an enormously deep ravine which will be very difficult to cross, next comes about 20 miles of easy work, and then the ascent of the Maltrata pass, a distance of 23 miles. The next point is Boca del Monte, which is 8,100 feet above the level of the sea. There is, however, a section between Boca del Monte and Elsinale, about 23 miles long, which is exceedingly difficult, and can not be built unless a large amount of funds be subscribed.

THE LIFE OF RAILS.—In the last annual report of the Lehigh Valley Railroad Company, some interesting facts are given concerning the use of steel rails on the road. The experience of the past year has been satisfactory. The steel rails laid in 1864, on the Beaver Meadow Division, look as well as they did a year since, with the exception of three rails, which show signs of wearing out. During the past year, 13 93 miles of track have been re-laid with steel, making the amount of steel track now 32 31 miles. In 1869 the company laid 1,530 tons of the best English iron rails, guaranteed to last from five to seven years; but they have not proved satisfactory, and the report says that it is demonstrated that "nothing short of all steel, or steel-headed rails, will prove economical under the present heavy and rapidly increasing traffic of the road." The relative value of steel and iron is illustrated by the experience at the scales at Packerton. The first iron rails laid upon the scales lasted 1 year and 23 days, and passed a tonnage of 2,263,675 tons. The second set of rails were in use 7 months and 19 days, and passed a tonnage of 1,524,870 tons. Steel rails laid May 28th, 1869 have passed 5,509,381 tons, and show no perceptible wear. The company has contracted for 1,000 tons of steel rails to be laid this year, and we judge that before many years the whole road will be re-laid with steel. All our other railroads having a heavy traffic to carry will probably be re-laid in the same manner.—*Evening Bulletin*.

The Coal and Iron Deposits of Great Britain and West Virginia.

From a recently published report on the "Mineral and Agricultural Resources of the Kanawha Valley," by Howell Fisher, geologist and mining engineer, we extract the following interesting comparison of the coal deposits of Virginia with those of Great Britain:

"The coal area naturally depending upon the New river and Kanawha valleys of West Virginia for its outlet (in fact by its contour inaccessible by other passable outlets) embraces a territory of over six thousand square miles, the extent of which is more readily comprehended when the fact is stated that it is quite equal in superficial extent to the whole productive coal area of Great Britain, from which is now mined over one hundred million tons of coal per annum. The great variety and fine quality of the coal of the middle sections of this field are well known and frequently attested. The fine, fatty bituminous, the splint and the cannel, are the principal varieties. The work, 'Coal, Iron and Oil,' by Daddow & Bannan, edition of 1866, page 34, speaking of this location and its coal, says: 'Coal river, Elk river and Gauley diverge from the Great Kanawha, and spread their branches over one of the richest and most magnificent coal regions in the world, and bring down their wealth to one common center on the Great Kanawha. The coals of this region generally are better, purer and more available for all the requirements of trade and manufacture, than the coal from any other portion of the Alleghany coal field. The seams of coal are more numerous and their thickness greater than in any other portion of this coal-field; it can be mined cheaper, and with more economy generally, under the same rates of labor, than in any other region in this country, without exception.' The peculiar splint coal of this section is a superior fuel in its raw state for the manufacture of pig iron. Statistics of analysis made show the Kanawha coal to be among the purest found in the world. The number of workable beds is variously stated from seven to fourteen. There are five items that affect the value of a coal-field: First, quality of the coal; second, quantity; third, accessibility of the coal itself; fourth, market. The last, one of the most essential, will be given to this region by the Chesapeake & Ohio Railroad. In the third item, the most essential to cheap and profitable working, this region stands unrivaled. It has been stated before that the chasm of the river renders it most peculiar service in its relation to the coal. Cutting all the coal strata for nearly its whole length entirely through, and getting down among the shales under the coal, this river has caused the numerous streams which pierce this whole region to cut down through most of the coal-bearing strata on their courses, leaving the coal entirely above water level, accessible at hundreds of points by simply scraping off the surface soil; so that, so far as the mere getting of the coal is concerned, two thousand dollars will open a mine ready to ship one thousand tons per week. There is no region in the world where less physical labor will prepare a mine for delivery of coal at the drift's mouth.

"This will be made clearer by a comparison of the position of coal here and in Great Britain in this respect. In Great Britain, and in fact in almost all of the European coal-fields, the coal is deep below the water level. To reach the seams, requires the expenditure of years of labor and vast sums of money in

sinking shafts or pits, and in erecting pumping and hoisting machinery, to be maintained and renewed at heavy annual expense. It is authoritatively stated that the cost of sinking shafts in the Newcastle region of England to the depth of one thousand feet has been, in many instances, one thousand dollars per yard. In the great northern coal field of Great Britain, producing twenty million tons per annum, there are two hundred pits or shafts, costing in first outlay for sinking and machinery, fifty millions of dollars, to which must be added the necessary expense of constructing and maintaining proper air courses and their accessories requisite to the safety of the employees. There are now invested, simply in pits and machinery for pumping and hoisting the one hundred million tons produced in Great Britain, two hundred million dollars, and this vast sum is destined to utter destruction in serving the purpose for which it was used. These pits and machinery being constructed, they involve a certain amount of labor for every ton of coal got, in addition to their cost and renewal. Now, in this great coal-field, crossed by the Chesapeake & Ohio Railroad, nature has already sunk all necessary pits and shafts, which need neither repair, renewal, or labor to work them. The laws of gravity have provided the most perfect, permanent, and costless pumping machinery; and the most perfect ventilation of the mines and safety of the employees, instead of requiring scientific knowledge and anxious thought, is simply a matter of the most ordinary care, the almost perfect freedom from noxious gases being the natural result of the position of the coal strata."

RAILWAY PROGRESS—The following table will show the progress of railroad construction in this country from 1827 to 1871:

Year.	Miles open.	Yearly increase.	Year.	Miles open.	Yearly increase.
1827.....	3	...	1850...	7,475	1,125
1828.....	3	...	1851...	8,589	1,144
1829.....	28	25	1852...	11,027	2,438
1830.....	41	13	1853...	13,497	2,470
1831.....	54	13	1854...	15,672	2,175
1832.....	131	77	1855...	17,698	1,726
1833.....	576	445	1856...	19,251	1,853
1834.....	762	186	1857...	22,625	3,374
1835.....	918	156	1858...	25,000	2,465
1836.....	1,102	184	1859...	26,755	1,665
1837.....	1,431	229	1860...	28,771	2,016
1838.....	1,843	412	1861...	30,593	1,892
1839.....	2,224	447	1862...	31,769	1,176
1840.....	2,797	577	1863...	32,471	702
1841.....	3,819	522	1864...	33,860	1,389
1842.....	3,877	558	1865...	34,442	582
1843.....	4,174	297	1866...	35,351	900
1844.....	4,331	137	1867...	36,896	1,545
1845.....	4,522	211	1868...	38,822	1,926
1846.....	4,870	348	1869...	42,272	3,450
1847.....	5,336	466	1870...	48,860	6,588
1848.....	5,682	346	1871...	51,435	5,574
1849.....	6,350	668			

☞ An experiment has just been made at St. Petersburg for the purpose of testing the utility of the electric light as an agent in warfare, and the success of the trial was unexampled. With a piece of ordinary field artillery, on a dark night, every shot fired hit the target at a distance of 1,660 yards, or very nearly an English mile, both the mark itself and the surrounding objects to a considerable distance being rendered perfectly distinct by the light thrown upon them.

☞ The revenue of Great Britain last year amounted to \$336,830,765 in gold.

The Longest Tunnel in England.

The London and North-Western Railway from Liverpool and Manchester to Huddersfield and the North, passes through a range of hills separating Marsden on the Yorkshire side and Diggle on the Lancashire side, the range bearing the name of Stand Edge, and it has now three tunnels running through it, one a canal tunnel, and the other two for the purposes of the railway. The first named was commenced in 1794 and completed in 1811; length, 5,451 yards, or 3 miles and 171 yards; cost, 123,803*l.*, and the loss of life during its progress was serious. The first of the two railway tunnels was made by Mr. T. Nicholson, contractor for the Woodhead Tunnel, which is shorter than the Stand Edge one by about 40 yards, Stand Edge being 3 miles and 60 yards long. It was commenced in 1845 and completed in November, 1848; the cost 171,003*l.* 12*s.* 3*d.*, of the approaches 30,605*l.*, making a total of 201,608*l.*, and the largest number of men employed on the undertaking was 1,953. Nine fatal accidents occurred in its construction. Messrs. Thomas Nelson & Sons, of Carlisle, were the contractors for the new tunnel; the work was commenced in the middle of April, 1868, and was completed in the middle of October, 1870, or six months earlier than the time specified. Its exact length is 5,435 yards, one yard less than its twin tunnel; but the actual length constructed by the Messrs. Nelson is 5,297*½* yards, the difference arising from a short piece at each end having been made when the first railway tunnel was executed. The whole length is lined with red bricks, faced with blue Staffordshire bricks. The height of the tunnel inside the brick work is twenty feet, and the width fifteen feet. The total quantity of brick work built is 52,156 cubic yards, the total number of bricks used being 16,831,149, the weight of which amounts to 68,000 tons; 6,271 tons of coal, 472 tons of coke, 2,421 tons of lime, 140 tons of cement were consumed; and of powder, 1,744 casks, equal to 174,400 lbs.; fuses, 35,853 coils, each 25 feet, equal to 170 miles. candles, 8,745 dozen pounds, equal to 104,940 lbs.; oil, 6,416 gallons; and vast quantities of timber were used. The rubbish was conveyed away by means of tramways, which ran through passages under the railway, and was tipped into the boats on the canal before mentioned. It was conveyed through "break-nps" or cross-headings, of which Messrs. Nelson constructed twenty-one, but only sixteen were used at one time. For the conveyance of the material used in the construction of the tunnels twenty-five boats and four steamboats were constantly plying, and an immense expense had to be incurred in erecting huts, providing business offices, and putting down costly plans for economizing labor. Only one life has been lost during the construction, but there have, of course, been plenty of accidents of a less serious nature. The work has been pronounced satisfactory in all respects, and the line is reported as being one of the smoothest portions of railway traveling in the kingdom. The line was opened about the middle of last month for regular traffic.—*Times.*

☞ The coffee plant attains the height, in general, of eight to twelve feet, and sometimes even to thirty feet.

☞ Nearly all the brimstone the world uses comes from Sicily—about 300,000 tons annually.

Railroad Items.

—The Southern Pacific Railroad Company filed an amended certificate of incorporation April 15, at Sacramento, with the object to purchase, construct and operate a continuous line of railroad from San Francisco through the counties of San Mateo, Santa Clara, Monterey, Fresno, Kern, Tulare, San Bernardino, and San Diego to some point on the Colorado River, distant seven hundred and twenty miles, as near as may be from the point of beginning; also a branch road from Tehacheppe, to pass via Los Angeles, to the Texas Pacific Railroad at or near the Colorado River, distant three hundred and twenty-four miles; also a line from Gilroy to Santa Clara, passing through Santa Cruz and Monterey counties to Salinas City, or some point near it, distant forty-five miles; also such other branches as the Directors may hereafter deem advantageous to be established. The Directors of the company are Lloyd Trevis, Leland Sandford, Charles Chocker, C. P. Huntington, Mark Hopkins, Charles Wayne, Peter Donahue. Capital, \$75,000,000.

—The annual report of the President of the Illinois Central Railroad Company, shows that the net earnings of the road, including the net earnings of leased lines in Iowa, was \$2,857,321. The capital stock is \$25,278,710, and the total amount of bonds outstanding is \$8,235,000, the aggregate of stock and bonded debt being \$33,513,710, on which the net earnings of the company's roads would be 8½ per cent. This, however, is exclusive of the operations of the Land Department. The original grant to the Illinois Central was 2,595,000 acres, of which the company still hold 415,610 acres.

—It is rumored, says the White Pine News of February 21st, that the surveying party for the preliminary survey of the road for the narrow gauge, between this place and Elko, is complete, and may be ordered to start at any time within twenty-four or forty-eight hours. This looks like business, and from the reputation of the parties having it in charge, it will be no kid-glove affair, but hard, expeditious work.

—England is a great iron producer and exporter. Taking the subject of iron rails, we find that in January last she exported 28,264 tons to this country, 22,338 to other countries, so that after all, we are her best customers for railroad iron.

—A party of gentlemen from Chicago, and another from Fountain County, Indiana, were in consultation yesterday with State Geologist Cox, with reference to the most feasible route for a railroad from the mining region of Clay County to Chicago. The project is a new one, and the parties moving in it are said to possess abundant means to put it through at once.

—The Southern Pacific Railroad to lead, from San Francisco to the Colorado River—eighty miles now in operation—has been mortgaged for \$28,000,000 to raise funds for its completion.

—The Burlington, Cedar Rapids and Minnesota road will be extended to Blue Earth City by January 1, 1872.

—The total lumber product of Michigan for 1870, according to the most accurate returns accessible, is 1,550,056,278 feet.

—Surveyors have commenced to survey the route for the Utah Southern Railroad.

—It is proposed to connect Reno, Nevada, by a narrow gauge railroad. The survey of the proposed route has already been commenced.

—The ship Research, 1,300 tons burden, has just sailed from Philadelphia with \$10,267 barrels of refined petroleum, valued at \$100,000, being the largest cargo of this article ever shipped from any port in this country.

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CINCINNATI, OHIO.

RECEIVER'S SALE.

Jacob T. Martz, Receiver of the Cincinnati and Mackinaw Railroad Company, plaintiff,

vs.

The Road Bed, &c., of said Railroad Company.

The State of Ohio Darke County Common Pleas, No. 3,280.

By virtue of an alias order of sale made by the Court of Common Pleas, within and for the county of Darke, and State of Ohio, at the June Term, A. D. 1868, of said Court, in the above entitled case, and to me, as Receiver, appointed by said Court, of the said Cincinnati and Mackinaw Railroad Company, issued and directed, I will sell at public outcry, at the door of the Court-house, in Greenville, in said County of Darke, on

SATURDAY, MAY 6, 1871,

at the hour of 2 o'clock, P. M., of said day, the following described property, rights, franchises, &c., of the said Cincinnati and Mackinaw Railroad Company, situate and being in the counties of Darke, Mercer, and Van Wert, in said State of Ohio, to-wit: The Road Bed, and right of way of the said Cincinnati and Mackinaw Railroad Company for a railroad, commencing at a point near Greenville, in Darke County, aforesaid, and extending through the counties of Darke, Mercer, and Van Wert to the town of Van Wert, in said last named county, in the State of Ohio, including the bridges, fixtures and culverts, railroad ties on the same, or intended for the said road, together with the right of way owned and held by said Company for the construction of its said road, together with all the rights and franchises of said Company for the construction of and maintaining its road in the said State of Ohio, together with all other property real and personal, belonging to said Company, in said State of Ohio, intended to be used in the construction of its said road.

Appraised at Seventeen Thousand Dollars.

Terms of Sale, Cash.

W. A. WESTON, Receiver, Cin. & Mack. R.R. Co.
C. CALKINS, Attorney; March 23, 1871. 23-3-70, St.

The Railroad Record.

E. D. MANSFIELD, - - - - } Editors
T. WRIGHTSON, - - - - }
A. J. HODDER, - - - - }

CINCINNATI, - THURSDAY, APRIL 27, 1871

The Railroad Record,

PUBLISHED EVERY THURSDAY MORNING,

By Wrightson & Co.,

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The Tunnel.

THE PROSPECTS EXPECTED, AND THE ENDS ACCOMPLISHED.

In our two former articles we have treated of what Cincinnati might become, of what it needed, what facilities it ought to furnish in public works (of which the tunnel is one), and now we come to speak of what many will regard as the all important point to those who engage in it. This is, what great ends are to be accomplished for the city; and if citizens engage in it, what profits may they individually expect? In one word, will this work pay to those who engage in it? We have ourselves spent a great deal of time and labor in trying to help the public good without getting much reward, but we have no idea there are enough fools of that kind (we speak the language of the world) to do this work without some prospect of pay. Moreover, we assume as a demonstrable principle, that if any public work is really useful and beneficial to the public good, that it will pay those who do it. Sometimes the reward is delayed and comes late, but it will pay.

What will the tunnel accomplish which should be paid for? We have seen and examined the report of the company, and found from that what it will do, and what its cost will be. The objects of the tunnel are twofold: 1. To make an entrance for railroads to the upper plain and heart of the city, which they have not now got; 2. To supply an outlet and inlet to the immense suburban population which must soon live north of and beyond the hills. The first object was that of the original projectors, who expected, if the

tunnel was made with two tracks, all the railroads would actually enter through the tunnel. And if the tunnel was made at this time, we have no doubt several roads from the north and east would do so. Granting this, we nevertheless think that in a very few years the transit of working and business people, who live in towns and villages beyond the hills, will make much the largest part of the business and profits of the road. Indeed, we think the tunnel will pay handsomely, if it be made simply on the principle of a street car route. This is a bold proposition, but we think perfectly demonstrable. Let us now look into the cost and profits of the tunnel road. The report gives the following facts:

1. Tunnel, 10,000 feet in length.
2. Tunnel road to Sharon (in all), 12½ miles.
3. Total cost, \$1,200,000.

This cost includes every possible contingency, the tunnel, steel rails, locomotives and cars, so that there can be no more afterclaps. This is the whole capital required. The road goes to or near Sharon, which is 10 miles beyond the tunnel, and that 10 miles may cost \$500,000; so that, really, \$700,000 is all required for the tunnel and its equipments. But we shall take the whole road to Sharon as the basis of calculation, because without it we shall not have facilities for outside people. Let us then begin fairly.

1. The income expected from railroads. We can estimate, from other companies, nothing which is not directly for their interests, and therefore we shall look only to that. If the tunnel road begins at Sharon, there will be but 12 miles between that and a point on the Little Miami Railroad called Gainsborough, which is also 7 miles from Lebanon, in the valley of Turtle creek. The Pennsylvania road now owns the Wilmington & Zanesville road, which is about to be connected at New Lexington with the Sunday creek coal mines. Now, it will be the direct, immediate and inevitable interest of that company to continue the Wilmington road through the tunnel to the upper part of Cincinnati, so that an iron coal car can be filled at the mouth of the mine and dumped in the coal yard. Supposing that to be the fact, we affirm without the fear of contradiction, that that road would command the coal trade of the north half of Cincinnati, for the carting of coal from the river to the upper half of Cincinnati will cost as much as the actual cost of carriage on the railroad. We leave this hint here, and say that the Pennsylvania road will, for irresistible reasons, go through the tunnel when made. The Chesapeake & Ohio will assuredly be finished to Cincinnati, and the best route will be by the east fork of the Miami, and the cheapest through the tunnel. The Marietta has found another entrance, but it is two miles longer than it ought to be. Of these three roads we may safely assume that two of them will go through the tunnel, and will be glad

to pay each 6 per cent. on the cost. We have then \$144,000 per annum from this source.

2. The income from suburban inlet.

How long will it be when the work on the tunnel is nearly completed, and it is certain the road will be made, before there will be three or four towns laid out between the north end of the tunnel and Sharon? Suppose only two such places are started, which together cover 600 acres, divided into lots of (although they may be of very different sizes to suit the demand) 50 by 200 feet; this will give 16 lots per acre, or allowing for alleys and streets, 14, which will give 8,900 lots. Supposing them to be occupied at an average of 5 persons to a family, there would be 40,000 people in these suburban towns. But no doubt the adjoining proprietors would lay out grounds, and increase the number of lots to suit the demand. Now we think we hear somebody, who lives in the present only, say, this is a nice calculation on paper; who ever heard of towns filling up with 40,000 people in a day? Stop, my dear sir, we don't propose to fill it up in a day. It will take a little time to make the road, and a little time to get ready, and in this while Cincinnati is fast increasing and overflowing. Let me tell you, dear sir, that 20,000 people have gone in three or four years to Elizabeth, 15 miles from New York, and tens of thousands to other places further off. But Cincinnati is not New York, you say. Certainly not; but how long since New York was no larger than Cincinnati. We saw it half the size of Cincinnati. We have demonstrated in a former article that in twenty years Cincinnati will, in all human probability, receive 250,000 people in addition to what she has now, and that 150,000 of them will be north of the crest of Mount Auburn. There will be an average of 7,000 people per annum going north of the hills and east of Mill creek. Half that will be in the vicinity of the tunnel road. We say then, with unhesitating confidence, that if this plan be carried out, the 40,000 people in these towns, and many more, will soon be there. Between Cincinnati and Sharon, on the line, there are now 3,000 people to use the road. The lots in the villages being sold very low, will, with the adjoining country, settle up at an average of 5,000 per annum; in 1882 there will be 50,000 people on the line of the road, and in 1890 more than 100,000.

Let us now make some estimate of what business this rate will produce. The census shows that there are about 40,000 people in Newport and Covington, and more in adjoining villages. Marshal Hickenlooper employed his deputies at the ferries to ascertain how many persons crossed and did business in Cincinnati. He found no less than 27,000 people on the Kentucky side who really belonged to Cincinnati and did business here. This furnished nearly 10,000 persons crossing the river every day. Here we have data

which is reliable. We may count 1 in 4 of the suburban population going in and out every day. The lots and houses in the suburban villages will be decidedly cheaper than in Newport and Covington. The workmen, as we said, will go there at the rate of 5,000 a year. Now we shall have this result after the road is finished:

1st year, say.....	2,000
5th "	7,000
10th "	12,000
15th "	17,000
20th "	22,000

Now, suppose these are commuted annually at the very small sum of 10 cents per day, or \$35 per annum; then we have \$70,000 receipts the first year, \$245,000 the 5th, \$420,000 the 10th, \$595,000 the 15th, and \$770,000 the 20th. Now add to these the minimum railroad receipts, and take the 10th year as an average for the whole, and we have:

Railroads.....	\$120,000
Passengers	430,000
Way freight.....	40,000
Total.....	\$580,000

The cost of running will not be half that of common roads, and can not be put at more than 25 per cent. Then we have the result:

Capital.....	\$1,200,000
Net profits	460,000
Actual profits	38 per cent.

In our opinion this calculation can not be impeached, and the results are likely to exceed it.

The Springfield & Cincinnati Railroad.

We received a letter from a friend making the inquiry why we opposed the building of the Short Line Railroad so violently, when it is notorious that we have hitherto been its especial champion.

We reply, that we are not opposed to the building of the Short Line Railroad, nor have we changed our opinions of its merits and necessity, nor our belief that its construction is only a question of time. All that we have said and written upon this scheme for the past 15 years we now approve of and indorse, and expect to say and write again before the enterprise is completed. And in our present "violent opposition" we do not understand ourselves as opposing the making of this road, but on the contrary as being its best friend.

Our reasons for taking the course in this matter that we have are because we have no faith whatever in the present movement, that proposes to build this road. From the beginning to this moment we have believed it a deep laid plan, that has been persistently carried out, to force the C., H. & D. company to pass its road into the hands of some other company, or ring of adventurers, upon their own terms, or to so affect the stock of the C., H. & D. road as to enable these speculators to buy it up at a discount from its real value, and thus make a snug sum of money by the

rise when they abandoned their opposition scheme, or enable them to control the road at its next election for directors.

These things have been done before, and by some of the same parties who are manipulating this movement, and they have won, as we hope they never will again; for the C., H. & D. road is about the only one of any importance in our State, that has not been wrested from its owners, and placed under the control of foreign interests.

All that this new Short Line company have done, up to this time, is not of a kind to inspire faith in their professions. If they were really in earnest about building the road, why make such a feint as they did on the Lebanon line; why couple all their guarantees and contracts with conditions that relieved the workers of the scheme from personal responsibilities; and, above all, why make the terrific onslaught upon the C., H. & D.'s interest that is now going on in Columbus?

It is now nearly a year since this Springfield & Cincinnati concern was organized. It was ushered into existence with the announcement that it was going to make this new road in a very short time—five or six months we believe. But instead of moving an inch of ground towards this end, it has been beating about a little section of the Miami valley that lies in an oft explored and thoroughly ransacked strip of about fifteen miles wide and sixty miles long.

One would naturally suppose that a company organized as this claimed to be, and backed by such vast sums of money, and such indorsements of other well known and powerful companies, as it was announced this one was, would have done something more than a little surveying and a large amount of blowing by this time, if they were in good faith. Had they gone to work when they started, by this time the road would have been nearly or quite graded; and what trouble, we ask, would it have been, under such circumstances, to have secured an entrance into Dayton, either by legislative action or some other equally effective means, just where they desired?

Twenty or thirty miles of graded road, and the work going rapidly on, would be tenfold more potent in the present struggle at the State capital, than all the lobbyists who are there to wheedle and coax stubborn legislators, the illuminating influence of "Old Bourbon,"—or the logical power of the money that ought to be expended upon the work, if expended at all.

The company can't plead poverty, or want of experience, or time; they may plead eccentricity and a new mode of railroad building, a desire for an experiment, by commencing at the other end of things than that long since settled by the profession and experience as the proper one. But even this would avail them nothing, as it is too transparent to deceive even that unfortunate fellow who has but "half an eye."

Now, whether right or wrong, we have given our own interpretation to all this maneuvering, and it is *that this company did not mean to make the new road, if they could avoid it.* Then what do they mean? is the most natural of questions in this connection. They are certainly not doing this for the mere fun of the thing. We think they *meant* to drive the C., H. & D. into their pockets, some way or other, either by securing a lease of the road upon terms most profitable to themselves or those they were created to serve, or by depressing the stock of that company, and speculating in it. And believing this, as we did at the start, and as we have ever since and do now, we became "violently opposed" to the movements and designs of this company, not the Short Line, and so warned the people upon the line of the road not to permit themselves to be used, and again deceived, and their project for a road injured, by aiding the selfish designs of this mythical company.

In this we did our duty as railroad journalists, and still believe we were right, and shall continue to do just so, under the same circumstances, in the future.

We hope this will satisfy our friend, that it is not the Short Line road we oppose, but a company that use it to kill it, and by its destruction secure their own ends.

We are occasionally reminded that this company has made and recorded a mortgage for a million or two of dollars, and that large sums have been offered the manipulators of the scheme to abandon it, which have been refused, and that a great deal of money had been expended in surveying and in the service of agents to secure right of way, etc., and now, that propositions for the work are invited. All very true, and it may all be turned to good account. But we remember and so do our readers, that four or five years ago the Cincinnati, Dayton & Eastern Railroad Company went much further than this upon the same work, they spent three times as much money, obtained ten times more local interest, made unconditional contracts for extensive property in and out of the city, and absolutely awarded the contract for building the road to responsible parties, and yet they abandoned it all when the designs they had planned from the beginning were only then attained. So this amounts to nothing.

But without following this matter further, we simply say, that while we can not countenance such ventures, as we think the present one is, we will most earnestly aid any company, by all the means in our power, to make this new road, and that if the Springfield & Cincinnati Company, in order to save what it has invested in its past year's operations, and secure an independent line into the city, should undertake to do this work, we shall be found just as ardent in our support of such an effort, as we have been violent in our opposition to its late gerrymandering.

J. H. Potter.

This gentleman, so well known in railroad circles of the West, gave us the pleasure of his company for a few hours on Saturday last, and informed us upon the organization of new railway projects, and the progress of old ones, in that section of the West where he has been operating since he left this city, and of which, Burlington, Iowa, is the center.

Our readers will remember that Mr. Potter became connected with the Burlington & Cedar Rapids road about two years ago, as President of the construction company, that had assumed the responsibilities of completing that work. Under his auspices it was prosecuted so rapidly that it is finished and accepted by the railroad company, and, we are pleased to say, is in full and successful operation.

No sooner was this work off the hands of this company, than they engaged to construct the Burlington & Southwestern road, a line that reaches from Burlington across the southern part of Nebraska, and into Kansas, upon some eligible point of connection, yet to be determined, upon the Kansas Pacific road.

Mr. Potter tells us that all the work done by his company has been paid for with means raised in the State of Iowa, and by the interests that are the direct beneficiaries of the investment. This speaks well for the enterprise of the people of that young, go-ahead State, and their intelligent appreciation of the importance of railroads as a means of rapid improvement.

We wish the wealthy citizens of our city, and of parts of our State, where unfinished railroads are either dragging their slow length along, or standing stock still, could be inspired with this sort of spirit. We have the capacity to do all that we confess is necessary in these particulars, but we want a little more confidence, and a little more nerve. With these our Southern road would advance, and the Ohio extension of the Chesapeake & Ohio road would be far on its way, and the tunnel entrance through East Walnut Hills would be in progress; and several other improvements necessary to the prosperity of our city would be out of the talking period where they have so long tarried.

Our friend shows the effect of the hard work he has gone through. He can not lift the weights in the scales that he could when he left here, by at least a quarter of a hundred, nor is he rounded up and as flush in color, (though much more so in money) as he once was. But he is cheerful and active as ever, and *en route* eastward, where we hope the "salt-sea breezes" will soon restore him to his original proportions.

There are 74,000 doctors in the United States, or one doctor to 518 inhabitants. In 1860 there was one doctor to 572 people.

Personal.

Mr. Harry W. Fuller, the South-western Agent of the Erie railway, who is located in Kansas City, made our place a flying visit a few days ago, and in the midst of his hurry complimented us with a call.

We were quite pleased to learn that Mr. Fuller's prosperity has been largely advanced in material things by his location in Kansas City, and also, that the affairs of the Erie in and about that locality are in a most prosperous condition.

Mr. Fuller, by his courtesy and diligence in the exercise of his duties, has won an extensive popularity, and the highest approbation of his company, and is, therefore, capable of a future usefulness, to himself and employers, of the first order.

Messrs Ed. F. Fuller, H. P. Clough, J. B. Clement, Charles F. Southgate, and Thomas B. Paxton, all of this city, were yesterday elected directors of the Straitsville Coal and Iron Mining Company.

The Newark, Somerset & Straitsville Railroad will be formally opened to Somerset to-day. There is to be a grand excursion and banquet to celebrate the occasion. We regret that we are unable to comply with an invitation to these interesting festivities.

Virginia Water Line.

Perhaps more than any other great work of internal improvement this is the most important, not only to the great central west, but also to the entire country, that has ever attracted the attention of American statesmen and political economists. The North American continent, it is well known, is divided into natural sections by long ranges of mountains and large systems of water courses. While the basin of the lakes affords an invaluable avenue for commerce on our northern frontier, for one-half the distance across the continent, yet the outlet is not in our own territory, and we are tributary to another power for any foreign traffic that may be floated on the waters of this great artery.

The territory of the United States is clearly divisible into three sections, the basin of the Mississippi and the Atlantic and Pacific slopes.

The great Appalachian range of mountains on the east, and the Rocky mountains of the west, form the boundaries of the valley of the Mississippi, which is the great central basin, perhaps the most extensive and productive in the world. Situated within the temperate zone, with an alluvial soil, unsurpassed, or rather unequaled, in natural resources and productive capacity by any portion of the earth's surface of equal extent, it is destined to become the great garden of the earth, producing an amount of surplus food products

the limit to which is only bounded by the market, and the capacity of the various lines of commerce to transport.

The route of the lakes, which but touches on the extreme borders of the interior basin, is, as we have already remarked, but partially under our control. Although this difficulty has, in a great measure, been overcome by the construction of the New York canals.

The other natural outlet to this traffic is the Mississippi itself and its tributaries. The great distance to be traveled, the dangers of gulf and ocean navigation, combined with the detrimental influences of climate upon food products while in transit, amount almost to a prohibition.

The next reliance then, must be on artificial avenues for this class of traffic. Railroads, that stop not, neither do they besitate, for river or ravines, for hills or for mountains, have been constructed, and the whole world knows with what results, both as to the development of the west and the east. An immense territory, but recently the solitary abode and pasture ground of the buffalo, is now divided into cultivated fields and occupied by happy homes, where refinement, education, civil liberty, and all the blessings of an elevated civilization, are to be found the same as exists in the oldest settled countries of Europe. All developed by railroads.

Railroads, however, have a maximum capacity for traffic, and a minimum of compensation below which they can not profitably exist. While there will ever be sufficient traffic for the great lines that do exist, or all that may hereafter be constructed, yet cheaper transit than they can furnish is needed for the food products of the west.

The great question is, how can this result be attained? In the solution of this problem not only the entire west is concerned, but it is of vital importance to the great cities and manufacturing depots of the eastern or Atlantic slope, as well as to the food consumers of Europe.

We answer, by the construction of the *Virginia water line*! connecting the waters of the Mississippi with those of the Atlantic.

IS THIS PRACTICABLE?

This question is definitely settled by the very able report of Major W. P. Craighill and assistants to Gen. A. A. Humphreys, chief of topographical corps, U. S. Engineers, being a report of the results of labors performed last year, in obedience to a resolution of Congress. On this question Major C. remarks:

"The question of *practicability* is settled by the data furnished by the reports hereto attached. They determine also that the cost will be, in round numbers, \$50,000,000. A most interesting feature of the work is the great tunnel. A few years ago men would have appalled at that undertaking alone.

"The recent completion of the Moant Cenias Tunnel in Europe, and the rapid progress now made with the execution of the Hoosae Tunnel in this country, with the experience gained

in these works, and the improved facilities daily coming into use for carrying on such operations, induce us to approach such an undertaking as the making of the Lorraine Tunnel, not only without apprehension of failure, but with a feeling of assured certainty of success. It is no longer an extraordinary, but an ordinary undertaking. The Lorraine Tunnel, by the last location, derived from the survey of 1870, will be 7.8 miles in length. The length of the Mount Ceniz Tunnel is $7\frac{1}{2}$ miles; that of the Hoosac being $4\frac{3}{4}$ miles. The Lorraine Tunnel, from the circumstances of its position, will take a shorter time for its execution than the Mount Ceniz and Hoosac Tunnels, although longer than either of them."

THE WATER SUPPLY

would be ample for the most enlarged traffic that the route could accommodate, and it would be open at least ten months in the year. On this point the report says:

"We have assumed a trade of 180 boats per day; but it will be prudent to provide a supply of water for 200. Allowing them one and one-half locks full of water to each boat passing the summit level, we will require 300 locks full of water per day for a maximum trade. The greatest lift between Greenbrier and Covington, the portion of the line to be supplied from the summit level, is 14 feet, and the locks being 120 feet by 20, we have 300 locks by 120 by 20 by 14, equal to cubic feet per day..... 10,080,000

Evaporation on 21.9 miles, (the tunnel being excluded,) $\frac{1}{2}$ inch per mile per day, cubic ft. 225,264

Filtration, cubic feet..... 5,240,400

Waste at structures, cubic feet. 43,200

Leakage at lock gates..... 1,728,000

Total cubic feet..... 17,316,864

The minimum flow of the Greenbrier, as gauged by Captain McNeil, was 97 ft. per second, or per day..... 8,380,800

Leaving to be supplied from other sources..... 8,936,064

Suppose the flow of the Greenbrier to continue at its minimum for an average period of 120 days, the total quantity to be furnished would be, cubic feet..... 1,072,327,680

The reservoir surveyed by Mr. Lorraine will contain 4,806,000,000 cubic feet, and the observed discharge of the stream, (where it has been gauged,) for a year of much less than the average rainfall, is..... 5,484,229,000

Diminish this by the evaporation of one-fourth of an inch per day for one year, from the surface of the reservoir... 899,405,100

And we have available for the canal..... 4,584,823,900

Or a surplus of..... 3,512,496,220

"As fears have been expressed by some persons not familiar with this subject, that a reservoir supplied chiefly from rain-fall might fail to furnish the anticipated supply, it is well to observe that the valley of the Greenbrier River is extremely favorable for the construction

of reservoirs, with which it might be filled throughout its length of 60 miles, in which any desired amount of water from the spring and winter floods might be stored up for use in times of drought."

COST.

As no one will dispute the importance of such a work, or possibly the necessity for its construction, the only remaining questions are what will be the cost, and will it pay. After a most careful examination of the whole project, and thorough survey by the Government engineers (and they had the advantage of the previous surveys made for the State of Virginia), the following is given as the detailed estimate:

"The estimates for this work (given below) contemplate the construction of the whole in a substantial manner, proportionate to its importance and the gravity of the results which would attend any stoppage of its use, caused by failures in its mechanical structures:

From mouth of Fork Run to Greenbrier, at mouth of Howard's Creek, exclusive of tunnel.....	\$ 2,383,474
Tunnel.....	13,253,310
Down Greenbrier and New Rivers.....	13,243,541
Down Kanawha River, (85 miles).....	973,900
Ten per cent. contingencies....	2,986,420
	<hr/>
	\$32,840,618
From Richmond to Fork Run.....	14,781,644
Total.....	<hr/>
	\$47,622,262

"The idea of connecting the waters of the Atlantic slope and the Mississippi Valley, by joining the head-waters of the James and Ohio Rivers, has long been entertained by distinguished men. It is certainly a very attractive project, from its simplicity and the grandeur of its results, both in a physical and Commercial point of view. It is far older than railroads, and so the use of the canal, as the means of connection, was proposed. When the railroad was introduced, public attention was turned in that direction, to the exclusion of the canal.

"Notwithstanding the immense increase of facilities for transportation which have been created in the past twenty or thirty years, the great West and Northwest have overrun them in their exuberant productive capacity, and after testing all other routes by rail and existing canals and lakes and rivers across the continent, and by river and gulf to the Atlantic, are calling loudly for the construction of a great, cheap, short, national highway, to carry to market their surplus products. This voice must be heard and heeded. The national character of this work is demonstrated by the statement just made.

"If a river existed along the whole extent of the proposed route of the water line, it would, unquestionably, receive from the General Government such improvement as it needed. This connection belongs to the same class of works as the Louisville and Portland Canal on the Ohio River, and the improvement of the Des Moines and Rock Island Rapids on the Mississippi."

WILL IT PAY?

There is one thing certain, it will pay the producer and the consumer, whether it be

made to pay the constructor or not; but we think the following table clearly demonstrates that it need not necessarily be unprofitable even to the constructor:

"In the present uncertain and embarrassed condition of the Ohio and Kanawha navigation, heavy freights are carried for about 1.8 mill per ton per mile. It is then too much to assume that by a systematic organization and the use of larger boats the cost may be reduced to $1\frac{1}{2}$ mill. We will, however, put it at 2 mills.

"I estimate the cost on the Greenbrier and New Rivers at 3 mills per ton per mile, and on the canal at 3.6 mills, making an average of about 3.16 mills per ton per mile, or \$1.52 $\frac{1}{2}$ for the whole distance from Ohio to Richmond.

The entire cost of the improvement will be about..... \$48,000,000

Six per cent. on which is..... \$2,880,000

Annual cost for maintenance..... 387,200

3,267,200

"With a trade of 5,000,000 tons per annum, a charge of 65.3 cents per ton on the through route will pay these expenses at the rate of 1.34 mill per ton per mile, making total cost, with tolls, but without profits to carriers, 4.5 mills per ton per mile.

	Per ton.
The average charges for ten years from Chicago to New York have been by the water lines.....	\$ 7 66 $\frac{1}{2}$
And by Central Railroad.....	14 31
From St. Louis flour has been carried to New York by rail for.....	13 00
And by way of New Orleans for	11 50

"The actual cost of transportation per ton per mile by the Virginia water line would be as follows:

From St. Louis to mouth of Kanawha, 903 miles, at .3 cent.....	\$2 71
Mouth of Kanawha to Richmond, 480 miles, at .316 cent.....	1 52
Richmond to Hampton Roads, 100 miles, at .25 cent.....	25
Two Transshipments.....	40

Cost from St. Louis to New York, without tolls on canal or profit to carriers..... 4 88

From Dubuque, Iowa, one of the cities on the Mississippi nearest to Chicago, to New York by rail is 1,145 miles; one ton of freight moved over this distance, at .12 cent per mile, would cost..... \$13 74

"From Dubuque to New York, by rail to Chicago, and thence by the northern water lines, cost as follows:

Dubuque to Chicago, by rail, 188 miles, at .12 cent.....	\$2 25
Chicago to Buffalo, by the lakes, 1,042 miles, at .2 cent.....	2 08
Buffalo to West Troy, by Erie Canal, 350 miles, at .4.....	1 40
West Troy to New York, by Hudson River, 151 miles, at .25 cent.....	38
Three transshipments.....	50

\$6 62

"From Dubuque to Hampton Roads by Virginia water line will cost:

Dubuque to mouth of Kanawha, by river, 1,367 miles, at .3 cent	\$4 10
Mouth of Kanawha to Richmond, 480 miles, at 316 cent.....	1 52
Richmond to Hampton Roads, 100 miles, at .25 cent	25
Two transshipments	40
Total.....	\$6 27

"Showing a difference from Dubuque of 29 cents per ton by the Virginia water lines over that by the lakes, although the difference of distance against it is 241 miles. Of all points on the Mississippi, Dubuque is one of the most favorable to the Northern lakes, in this comparison. The Virginia route is open several months, during which the Northern lines are closed by ice, and is free from the dangers which affect that navigation during the busiest months of the grain movement.

"In addition to through freights from the West to the seaboard, the trade of the Virginia line will be increased by local developments. The coal deposits of the Kanawha have been worked with marked success, though to a comparatively limited extent. Bituminous, cannel, and splint coals are found in abundance, and are mined with very little cost. The iron ores of East Virginia, lying near the line of the canal, cover large tracts of country. They are of excellent quality, and will be extensively developed by cheap coal from the Kanawha. Three-fourths of the salt works, formerly so productive, are now, I am informed, "dead rented" to proprietors of other works on the Ohio, to prevent their competition. They are capable of any required development. The general argument for the construction of this work is to be found in the necessity for more lines of transportation, and for cheaper rates from the Northwest to the Atlantic, as set forth in the memorials to Congress of the States of Virginia and Iowa. Time has not permitted me to present from original sources such statistics of Western production and transportation as would have been desirable.

"The surplus products of the Northwest exceed twenty-five million tons, of which from five to six million come to the Atlantic States over our four trunk lines of railway and the Erie Canal. The total wheat and corn crop of 1868 was nearly 1,000,000,000 bushels, of which there were received at the lake ports 84,000,000 bushels; shipped to New York, by water, 53,000,000; by rail, 14,000,000, and exported, 30,000,000 bushels. In 1869 the receipts at lake ports were 113,000,000 bushels; at New York, 62,000,000 bushels, and the exports for the year ending June, 30, 1869, 35,000,000 bushels."

SCIENCE AND COMMON SENSE.—Professor Huxley says: Science is, I believe, nothing but trained and organized common sense, differing from the latter only as a veteran may differ from a raw recruit; and its methods differ from those of common sense only so far as the guardsman's cuts and thrusts differ from the manner in which a savage wields his club. The primary power is the same in each case, and perhaps the untutored savage has the more brawny arm of the two. The real advantage lays in the point and polish of the swordsman's weapon; in the trained eye, quick to spy out the weakness of the adversary; in the ready hand, prompt to follow it on the instant. But after all, the sword exercise is only the hewing and poking of the clubman developed.

Relations between Business and Legislation.

The people of the United States suffer in nothing more than in the senseless mixture of purely business affairs with political issues and parties. Questions of dollars and cents are allowed to be complicated and sometimes identified with the fate of this or that political party. It is hard to tell whether the party or the business interests suffer more severely from this course. But there can be no doubt whatever that the whole people are seriously injured by it. Abuses are maintained and even intensified because they may benefit or injure this or that political programme. The Republican party is afraid to reform the currency and tax laws, simply from the fear of losing supporters who are interested in the maintenance of existing abuses. It does not stop to consider that support of this kind is always doubtful and sometimes dangerous. In the same way, the Democratic party tolerates monopolies and extortions for the sake of the precarious support of parties whose loss would be in reality a gain. In fine, the welfare of the country is subordinated to the interests of a party. The question asked is not whether any policy will be beneficial to the people, but whether it is likely to promote the welfare of a party. We have true and honorable men in all parties who honestly desire the prosperity and happiness of the people above all things. But their influence is lost in the remorseless caucuses that bend down all opposition to everything that involves the welfare or "harmony of the party."

This blending of business with politics is the greatest evil of our American system. In foreign countries the science of politics is devoted to the promotion of the business interests of the community. In this country politics, divested of science, is made the paramount consideration. In England if a commercial or financial measure is introduced by government it is referred to the interests more immediately concerned. Parliament merely ratifies the decisions of London merchants and bankers and Manchester manufacturers. If a loan is to be introduced or a tax to be levied, the banking and commercial interests are consulted as to the probable effect on the material interests of the country. Some years ago Mr. Gladstone resigned the Premiership and gave the Disraeli party a two years' lease of power, simply because the merchants and manufacturers represented that a dissolution of Parliament at that time would be prejudicial to business. The Imperial Government constructs great lines of railroad and manages the internal affairs of the Indian Empire in deference to the policy of Manchester cotton manufacturers. Fleets and armies are employed in all parts of the world to open new avenues of commerce and extend the markets for English manufactures.

In England the celebrated William Pitt sustained the great war against Napoleon Bonaparte by a financial policy based on the views of Adam Smith, the famous economist. In the United States, economists like David A. Wells and Charles Moran, in place of shaping the financial and commercial policy of the country, are driven from official position and openly ignored. The opinions of specialists and men of practical experience are over-ruled, and crude immature notions are pushed in defiance of the protests of business men and merchants. We adopt the obsolete and exploded systems of foreign countries, and incorporate in our commercial and financial legislation, the blunders of centuries. The simple and desirable process of funding the debt at a lower rate of interest is made a means of crushing industry by means of excessive taxation, and an inconvertible paper money. It is scarcely too much to say that the process of recovery from the losses of the civil war has been arrested ten years by the

blundering financial and commercial legislation that has been persisted in since the restoration of peace. Our public men of all parties have been slow to learn the great lesson of statesmanship that the political situation is always ruled and controlled by social conditions. The fault arises chiefly from a very excellent feature in American politics. Before the civil war the Federal Government imposed scarcely a feather's weight of burden upon any section or interest. Commerce, manufactures, territorial development, and railroads were free to grow and expand unrestricted by any centralizing influences, with the natural result of unbounded prosperity to all classes. There was no Federal Banking Law, and the merchants of New York and New Orleans, and the manufacturers of New England improvised a system that was exactly suited to their wants, and which was, probably, the best in the world.

The war changed all this. The necessities of deriving a great revenue necessarily imposed heavy taxes on productive industry. Every interest in the country was compelled to share the general burden, and properly so. This brought taxation—manufactures, commerce, finance, and currency—almost for the first time within the domain of party politics. It is little wonder if our public men were incapable of dealing with the new issues thus presented. They were compelled to treat every subject hastily and according to the immediate exigencies of the hour. The people almost welcomed every increase of taxation, because it seemed to promise a more speedy termination of the war. It is little wonder that blunders were committed. But the error of our politicians lay in perpetuating them after the necessity for their existence had passed away.

But the error carried with it its own redress. The people on whom devolved the burdens of taxation and finance gradually awoke to their true interests, and the result is the formation of the Revenue Reform movement, pledged to make politics subordinate to the business welfare of the community. This new Revenue Reform party is gradually influencing or absorbing both the old political parties, and is retiring into private life the leaders who were more prominently identified with the abuses of financial and commercial legislation. We have now the positive assurance that henceforth the financial and business legislation of the country will be conducted on sound economical principles.—*N. Y. Economist.*

THE NEXT COTTON CROP.—We have closely examined our country exchanges for the last three or four weeks to ascertain the intention of the planters with regard to the next cotton crop. From nearly every section of the South the reports agree in stating that the acreage under cotton will be largely reduced this Spring. In some districts, it is said, not half as much cotton will be planted as was last season. On the whole, we may safely estimate from twenty-five to forty per cent. reduction in the acreage. Planters now fully realize the folly of their action last season in entirely neglecting food crops. They have paid pretty dearly for their experience, and the cotton crop of the South will henceforth, no doubt, be kept within the proper limit of 3,000,000 bales.—*N. O. Picayune.*

GALVANIC ELEMENT WITH ONE LIQUID.—A galvanic element with one liquid, as recently announced, consists of a galvanic cell, composed of zinc and carbon, placed in a fluid made up of 40 parts of water, 4.5 of bichromate of potassa, 9 parts of concentrated sulphuric acid, 4 parts of sulphate of soda, and 4 parts of the double sulphate of potassa and iron, this producing a very regular current. It is said that the zinc need not be amalgamated and that no gas is evolved.

Improving Prospects of Business.

The condition of general business is so dependent on the financial operations of the Federal Government which lie outside the ordinary range of transactions, that it is usually difficult to predicate its prospects with any reasonable certainty. But at the present time a remarkable combination of circumstances points to results which are favorable to at least a decided improvement, if not to downright prosperity.

As a first and indispensable element of business activity, we find nearly every class in want of some commodity or product of which the others possess a sufficient surplus to constitute a basis of exchange. The South and West have products of all kinds which are in pressing demand by the Eastern States and for European consumption. In the same way, the Eastern States and foreign countries have the commodities which are required by the Southern planters and Western farmers. At the present time, the West possesses a very large quantity of breadstuffs. Chicago has stored no less than \$10,000,000 worth of grain and flour, awaiting the opening of navigation for transportation to tide water. The stock in Chicago is not proportionately larger than is held in other ports, and the whole forms only a small proportion of the quantity still retained by farmers in the interior. In the South, we find the bulk of the cotton crop has been sent to market but the proceeds of the portion that remains behind will be largely devoted to the purchase of commodities for household and personal use, and for the plantation. The Tobacco and other crops are also large, and a vast surplus of agricultural products of all kinds still remains to come forward. As the condition of business is usually determined by the surplus of commodities that may remain at the close of the season, after the first pressing demands of the producers for taxation and other purposes have been defrayed, it will be seen that we have sound elements of prosperity. The surplus of agricultural reserves that can be brought forward toward the close of the season, like army reserves in a battle, usually turns the scale in the direction of prosperity or the reverse.

But the medium for the interchange of these commodities remains to be considered. On this point the indications are satisfactory. The Federal Government is deeply interested in maintaining an easy money market, and this insures a sufficient supply of currency to move the crops to market. It is true, the surplus legal tender reserves of the New York City banks are reduced to a margin that would be risky under other circumstances; but this is caused by the flow of money to the interior for the movement of the crops, and in a few weeks it will return again. The accounts from Europe point to a very large demand for nearly all kinds of American produce. Our own harvest prospects are so far all that could be desired. From Europe the harvest reports are less favorable. Manchester is prosperous, and increasing its consumption of cotton. On the Continent, the cotton mills suspended during the war are reopening, and cotton is beginning to be in demand. In New York the imports since June 30, 1870, are over \$50,000,000 in excess of the amount during the corresponding period in the previous year. Then again, navigation opens early this year. The Lakes are already open, and it is announced that the Erie Canal will open, with the reduced toll sheets, on the 22nd of April.

But there is still another favorable element, the indications now point to the success of the new five per cent. loan. This involves a permanent reduction of the rates of interest by the heaviest borrower. The result will be that the Government will be partially withdrawn from competition with private borrowers, and a

large amount of capital will be devoted to business purposes and to railroad and other improvements for sake of the increased interest that can be derived. In a short time nearly all kinds of interest bearing stocks will be more profitable than Government bonds. This will increase the tendency of permanent or fixed capital toward Government investments. Bank and insurance capital, trust funds and money that is intended to secure a permanent income will be invested in Federal securities. On the other hand, the immense active floating capital of the country will flow, as of old, in industrial reproductive channels, with the result of an increase of employment, and a new impetus toward the development of our resources.

It will be seen then that the country contains all the essential elements of prosperity. The only drawback is the unredeemable paper currency; the taxes that press upon industry, and the persistent withdrawal of so large amount of money from reproductive industries to the unnecessary payment of the principal of the public debt. During the first quarter of the present calendar year, the debt has been reduced \$22,370,198, or \$6,000,000 more than last year. During the last six years, the debt has been reduced \$198,000,000. The average annual reduction during the last two years is \$112,000,000. This involves a taxation in addition to the large current expenses of the Government that is exhaustive. All political parties, however, seem to be at last convinced of the necessity of sweeping reforms in finance and taxation, and it is quotable that in another year, the more serious obstacles to business prosperity will be swept away.

The only unfavorable sign is the attempt now being made to render money artificially dear. A powerful clique is said to be formed to "corner" the money market. We can only hope that the movement will fail, and the indications all point to that result. The Secretary of the Treasury was the means of breaking up a combination of this kind, and as the success of the new loan depends on an easy money market, there can be no doubt that he will operate so as to overthrow this movement against industry.—*N. Y. Economist.*

LABOR CONDUCTIVE TO LONG LIFE.—In view of the short duration of life entailed by some occupations, it must be regarded as a consoling, yea a sublime fact, that labor in general does not tend to shorten life; while on the other hand, idleness and luxury are productive of the same results as the most unhealthy occupations. Dr. Guy, an Englishman, in calculating the average duration of life of the wealthy classes, arrived at the very surprising result, with regard to adults, that the higher their position in the social scale, the more unlimited their means, the less also the probability of a long life. We have been so long accustomed to consider the possession of riches as the best guarantee for physical welfare, that many will be surprised to hear from Guy that "the probability of the duration of life lessens, with regard to the adults in each class of the population, in the same degree as the beneficial impulse for occupation is lacking. If a person who for a long time has lived an active life, retires from business, it may be taken for granted, with a probability of ten to one, that he has seized the most effective means to shorten his life." We may smile at the soap maker who, after having formally retired from business, went, nevertheless, on each day of soap-boiling to his workshop, but it must also be acknowledged that his instinct did not mislead him. Of all conditions in life, idleness is the hardest for nature to combat; and this is especially true of persons who have accustomed themselves to a busy life.

THE LIFE OF LOCOMOTIVES.—At a recent meeting of the British Institution of Civil Engineers, an interesting paper was read on the maintenance and renewal of railway rolling stock. The author of this paper stated that observations, extending over forty years, had enabled the average life of each individual part of a locomotive and other rolling stock to be accurately ascertained. The lives of the different parts of the locomotive engine vary considerably, the break-blocks and other small parts requiring renewal every six months, while the side frames, plain axles and other parts, will last for thirty years. The first series of extensive renewals, which occur at intervals of five years, consist in the replacement of the brass tubes, and the cost during thirty years amounts to \$4,865. The renewals of crank axles follow in periods of six years, and the cost during thirty years amounts to \$1,280. The principal renewals, however, take place at intervals of seven and ten years, and include the substitution of new engine tires, boilers, fire boxes and other expensive portions, and the cost during thirty years amounts to \$10,595. The whole net cost of renewal during thirty years, however, amounts to \$24,450, or \$815 a year. The total original cost of the locomotive is placed at \$8,940, and it is therefore calculated that the "mean money life" of the locomotive described is practically eleven years, the phrase "mean money life" being understood as the period during which a sum equal to the cost has been expended in repairs. Again, taking the number of miles run as the measure of life, and considering 20,000 miles per engine as the average annual work, it follows that when a locomotive has run 220,000 miles, an amount equal to its first cost has been spent in repairs. In reference to the method of expressing the wear and tear of a locomotive by a curve, it is proposed to assume that the dilapidation increases as the square of the time and the curve alluded to becomes a parabola, the mean ordinate or average running value being taken at two-thirds of the original cost.

CONGRESSIONAL APPROPRIATIONS FOR 1872.—The following table shows the aggregate amount appropriated by the appropriating bills of the late Congress. It will be seen that the appropriations for 1872 are in excess of those for the current fiscal year:

Indian	\$5,729,369 22
Fortifications	1,477,500 00
Rivers and Harbors.....	4,305,500 00
Military Academy.....	310,069 50
Consular and Diplomatic	1,469,134 00
Pensions.....	29,050,000 00
Post Office.....	21,151,413 00
Army	27,719,580 00
Deficiency.....	10,569,559 75
Sundry Civil.....	22,583,500 66
Naval.....	19,841,306 25
Legislative, Executive, and Judicial.....	19,207,749 24
Total appropriations for 1872.....	\$163,414,681 62
" " " 1871.....	167,815,131 64

THE GRAIN OF WROUGHT IRON.—While good wrought iron shows a uniform jagged grain, moderate in size, the grains of cold short iron are arranged in a somewhat stratified manner. Wrought iron rendered cold short by a continued cold hammering (the aggregation of the iron being thus deranged) shows a fine grain with a strong lustre. Burnt iron has coarse, uneven, angular grains of strong lustre; iron containing particles of crude metal, uneven, coarse, and fine grains; iron which is brittle, owing to the presence of silicon, a mixed grain and fibrous texture.

INDUSTRIAL STATISTICS—The following facts have been obtained at the Census office of the increase per cent in the number of establishments of productive industry returned by the assistant marshals in 1870, over the number returned in 1860:

Alabama 43, Arkansas 76, California 41, Connecticut 73, Delaware 26, Florida 263, Georgia 91, Illinois 189, Indiana 112, Iowa 235, Kansas 324, Kentucky 48, Louisiana 142, Maine 47, Maryland 93, Michigan 173, Massachusetts 62, Minnesota 288, Mississippi 47, Missouri 242, Nebraska 332, New Hampshire 25, New Jersey 59, New York 59, North Carolina 1, Ohio 107, Oregon 267, Pennsylvania 64, Rhode Island 58, Tennessee 106, Vermont 69, Virginia and West Virginia 45, Wisconsin 129. Nevada is omitted from the statement on account of the small number received in 1860. Texas and South Carolina not made up.

Increase per cent. in the number of farms returned by the assistant marshals in 1870 over the number returned in 1860:

Alabama 22, Arkansas 7, California 19, Connecticut 4, Delaware 19, Florida 50, Georgia 2, Illinois 40, Iowa 93, Indiana 23, Kansas 257, Kentucky 28, Louisiana 23, Maine 4, Maryland 10, Michigan 52, Minnesota 154, Mississippi 49, Missouri 55, Nebraska 216, New Jersey 16, New York 8, North Carolina 21, Ohio 7, Oregon 48, Pennsylvania 13, Rhode Island 3, Tennessee 43, Vermont 8, Virginia and West Virginia 18, Wisconsin 51. In Massachusetts there appears a loss of 26 per cent., and in New Hampshire of 2 per cent. Nevada is omitted from the statement on account of the small number received in 1860. Texas and South Carolina not made up.

SILVER ORE IN NEVADA—The successful working of the newly discovered silver and lead carbonate mines in Nevada and Utah creates more than a White Pine excitement in the Pacific States. One mine is now producing bullion at the rate of more than \$1,000,000 annually, in three little furnaces that cost about \$5,000 each, and nearly fifty per cent. is net profit. The most productive mines so far opened are in the Eureka district, Lander county, Nevada, and Little Cottonwood district, 25 miles south-east of Salt Lake city. The Eureka district produces more precious metal a month than White Pine at its best, and is accessible to San Francisco by railroad. There are now in operation at Eureka twelve furnaces, which produce about 25 tons of bullion a day, worth \$9,000, or \$2,500,000 a year. The main vein in the mines is ten feet wide, and the entire width is rich pay ore, yielding about 25 per cent. of metal—four tons of ore to one of base bullion. The amount of ore in sight is very large. On the Eureka four shafts have been sunk at intervals of 200 feet, and they show the rich carbonates all the way down. The deepest has reached a depth of 200 feet. On the Phoenix claim, adjoining, there is one shaft 50 feet deep, and another of 20; and the Jackson mine, next to the Phoenix, has three shafts about 100 feet apart; and all of them, for their entire depth, are in the same rich carbonate of lead.

—The whole length of all the railways in the world is about 120,000 miles. The cost of the same was in round numbers ten billions of dollars. Those of Great Britain are the most costly, and those of the United States the least so. The railway system of the world is supposed to give employment to over one million persons.

Extravagance Among Business Men.

Extravagance in living is rapidly becoming the besetting sin of all our large cities. In fact, it is getting to be one of our national characteristics, and even foreigners who visit us, and who are familiar with the luxurious habits of the upper classes of European society, are astonished at the recklessness with which Americans now-a-days spend their money.

In this respect, things are different with us from what they were in former times. The days of republican simplicity and frugality, when our fathers were content with the gains of legitimate business, and honesty among the commercial classes was the rule rather than the exception, having given place to an era of fast living, as well as acquiring wealth. But the great trouble with us is, that the personal and family expenses of a large portion of our business men, during the last few years, have increased much faster in proportion than their means of indulgence.

Formerly, the partners of every well-to-do mercantile firm were in the habit of allowing a large portion of their annual profits to be reinvested as additional capital in their business, and of living plainly and economically upon the balance until able to retire upon a competency. Now, every young man, as soon as he becomes established in business, in order to secure his *entree* into society, must affect a princely style of living, which compels him to spend all his income, and sometimes to encroach upon his capital.

It is a notorious fact, since the close of the war, with the great falling off in business profits consequent upon the general shrinkage of value, a great many merchants and manufacturers have been living beyond their incomes. They know very well that if they continue to go on in this way they will soon have ruin and bankruptcy staring them in the face. But they prefer to run the risk, and trust to better times, or in some lucky stroke of speculation to retrieve their fortunes rather than retrench. They are men of the world, courting popularity and influence, whose wives and daughters move in the charmed circle of fashionable society, and they can not bear to give up any portion, however trifling of their outward display of opulence, for fearing of losing caste.

THE PRICE OF STEEL RAILS.—*Herald's Journal* states: We hear that every steel rail manufactory in the country is now full with orders for the next two years, and that the price of the best Bessemer steel rail is some £12 per ton. The difficulty now appears to be not to pay for steel rails but to get them. This great demand for them arises from the marked economy in their use. Considerable savings are being made by our railway companies in the maintenance charges, due to steel rails. Thus experience has already supported theory as to the great advantage of steel rails.

HOW CREOSOTING PROTECTS TIMBER—According to Dr. Letheby, creosote acts as a preservative agent in the following ways: 1st. It coagulates albuminous substances, and gives stability to the constituents of the cellulose of the young wood. 2d. It absorbs and appropriates the oxygen which is within the pores of the wood, and so checks, or rather prevents, the slow oxidation of the ligneous tissue. 3d. It resinifies within the pores of the wood, and in this way shuts out both air and moisture. 4th. It acts as a positive poison to the lower forms of animal and vegetable life, and so protects the wood from the attacks of fungi, acari, and other parasites.

A Marvelous Loom.

A week ago, says the *Hartford Post*, we copied an article from the *Tribune* relative to a new machine with the above name. Since then we have seen it, witnessed its operation, and examined samples of the cloth made on it. From those observations it appears that the claims made by the owners of this patent, although almost incredible, are fully sustained by the facts. As a matter, therefore, of interest to our readers we append a few remarks arising from a somewhat critical examination of the machine and its products.

The process of cloth making on this machine is a combination of those of knitting and weaving, a "warp" and "filling" being used, and the product is an actual cloth, not merely a loosely knitted fabric. The quality of the goods thus produced is unquestionably good, and it is difficult to see the limit to the possibilities of the machine. By a close study of its construction and operation, one who is acquainted with the machinery and processes generally used and employed for the production of textile fabrics must acknowledge that the claims of its proprietors can not be controverted, and especially when he witnesses the operation of weaving. They claim that it is adapted to the production of cloth, either woolen, cotton or linen, of any degree of fineness, "stockiness" or of any quality.

In fact it combines the advantages of the Jacquard and the common loom, and is equally adapted to weave carpets or fine cloth. The width of the cloth or the length of the web is limited only by the size of the machine, and whatever the width, the linear amount is the same with the circumferential speed. We saw the machine weave handsome woolen cloth at the rate of a yard a minute. This rate may be increased, as the machine will readily do good work at a speed of 40 revolutions per minute, weaving at the rate of one inch of cloth per revolution. The proprietors will warrant 250 yards per day, of excellent woolen cloth, on each machine, including all necessary stoppages for relinquishing the yarn.

No previous "beaming," "drawing-in," or "dressing" is necessary for the warp, as on an ordinary loom. Nothing but carding and spinning, and winding on bobbins is required. In fact, the machine uses merely the yarn from the bobbin, and as fast as one bobbin is exhausted another is put in its place, and the process of cloth making goes on indefinitely. There is actually no waste of material, no ends of warp or debris of filling to be thrown aside, all is used, and it matters not whether the yarn is slack twisted or hard twisted, good wool or shoddy, the yarn can be utilized. The texture of the cloth can also be governed readily by a simple and almost instantaneous adjustment of one part of the machinery.

The cloth produced by this machine is of excellent quality, will not ravel under any circumstances, is firm, even in texture and susceptible of a high finish. The machine seems to point to a revolution in some portions of our cloth manufacture. We understand that a company is now being formed in this city to control the manufacture in this State.

☞ The corn crop of the United States for 1870 was 1,100,000,000, a gain over last year of more than five bushels in the acre. The hog crop is a little over 20,000,000 tons, 15 per cent less than that of 1869.

☞ The large amount of deposits in the savings banks of New York is attributable to the fact that some of the institutions are allowed to receive \$5,000, and in some cases \$10,000 from a single depositor.

PROGRESS OF THE HOOSAC TUNNEL.—The Hoosac tunnel was advanced 405½ feet during March—the east end 153 feet, the central shaft 84 feet, and the west end 104 feet, while 64½ feet of brick arch was completed. The water in the central shaft continues to advance, and will do so until the new pumps, which are being put in position, are set in motion. At present, it is about 9 feet deep in the shaft and tunnel, and as the tunnel is excavated for over 200 feet from the shaft, a vast amount of water will have to be pumped out before the work can be resumed. The cutting off from work of two faces is rather a serious matter, and likely to retard the finishing of the tunnel greatly, but the Messrs. Shanley have taken hold of the matter in their usual energetic style, and during the summer months the work will progress steadily from all four faces.

NEW TRAFFIC ON THE MISSISSIPPI.—A large part of the rails used in the Mississippi valley are now imported by way of New Orleans, coming up the Mississippi river in steamboats or barges. Freights from Liverpool to New Orleans are usually very low, as vessels carrying cotton from New Orleans can not easily get cargoes back, and not infrequently are compelled to return in ballast. Once at New Orleans, the distances to all points on the Mississippi river and west of it (direct) are less than the distances from New York, and river rates are naturally less than rail rates. The Mississippi Valley Transportation Co. has recently completed a contract for the transportation of 20,000 tons of rails in barges from New Orleans up the river, and has just taken another to transport 30,000 tons.

Another new feature in the Mississippi river traffic is the transportation of pig iron from the furnaces at Grand Tower (on the Mississippi between St. Louis and Cairo) to New Orleans on the way to Philadelphia! It is to be mixed with Scotch pig there, rolled into rails, and then shipped back to Missouri to be used.—*Railroad Gazette.*

DETECTING BREAKAGES IN ROLLING STOCK.—Self interest is of great aid in sharpening men's faculties, and the managers of the Bavarian railways take advantage of the fact to sharpen the eyes of their employees to detect fractures or breakages in any part of their rolling stock. In Bavaria one of the rules of the railway system is to the effect that a reward, varying in amount from half a florin to one florin and a half, according to the importance of the case, shall be paid to every man employed at the stations, or on the lines, who discovers and makes known a flaw, defect, or break in the axle, axle-holder ("bandage"), or spring of any carriage or engine attached to a train, or any defect or break in a coupling-iron.

INDUSTRY.—Man must have occupation or be miserable. Toil is the price of sleep and appetite, of health and enjoyment. The very necessity which overcomes our natural sloth is a blessing. The whole world does not contain a briar or a thorn which Divine mercy could have spared. We are happier with the sterility, which we can overcome by industry than we could have been with spontaneous plenty and unbounded profusion. The body and the mind are improved by the toil that fatigues them. The toil is a thousand times renewed by the pleasures which it bestows. Its enjoyments are peculiar. No wealth can purchase them. They flow only from the exertions which they repay.

SUBSTITUTE FOR WASHING-SODA.—A German scientific journal recommends laundresses to use hyposulphite of soda in place of common washing-soda. It does not attack the fabric in any way, and at the same time exerts some bleaching action, which greatly improves the appearance of the linen and calicoes.

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7-30 GOLD LOAN

OF THE

Northern Pacific Railroad

RAPID PROGRESS OF THE WORK.

The building of the Northern Pacific Railroad, (begun July last), is being pushed forward with great energy from both extremities of the line. Several thousand men are employed in Minnesota and on the Pacific coast. The grade is nearly completed 266 miles westward from Lake Superior; trains are running over 130 miles of finished road, and track laying is rapidly progressing toward the eastern border of Dakota. Including its purchase of the St. Paul & Pacific Road, the Northern Pacific Company now has 413 miles of completed road, and by September next this will be increased to at least 560.

A Good Investment. Jay Cooke & Co. are now selling, and unhesitatingly recommend as a profitable and perfectly safe investment, the First Mortgage Land Grant Gold Bonds of the Northern Pacific Railroad Company. They have 30 years to run, bear Seven and Three-Tenths per cent. gold interest (more than 8 per cent. currency) and are secured by first and only mortgage on the ENTIRE ROAD AND ITS EQUIPMENTS, and also, as fast as the Road is completed, on

23,000 Acres of Land to every mile of track, or 500 Acres for each \$1,000 Bond. They are exempt from U. S. Tax; Principal and Interest are payable in Gold; Denominations: Coupons, \$100 to \$1,000; Registered, \$50 to \$10,000.

Lands for Bonds. Northern Pacific 7-30's are at all times receivable at TEN PER CENT. ABOVE PAR, in exchange for the Company's Lands, at their lowest cash price. This renders them practically INTEREST BEARING LAND WARRANTS.

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By BANKS and BANKERS generally throughout the country.

RECEIVER'S SALE.

Jacob T. Martz, Receiver of the Cincinnati and Mackinaw Railroad Company, plaintiff,

vs.
The Road Bed, &c., of said Railroad Company.

The State of Ohio, Darke County Common Pleas, No. 3,280.

By virtue of an alias order of sale made by the Court of Common Pleas, within and for the county of Darke, and State of Ohio, at the June Term, A. D. 1875, of said Court, in the above entitled case, and to me, as Receiver, appointed by said Court, of the said Cincinnati and Mackinaw Railroad Company, issued and directed, I will sell at public outcry, at the door of the Court-house, in Greenville, in said County of Darke, on

SATURDAY, MAY 6, 1871,

at the hour of 2 o'clock, P. M., of said day, the following described property, rights, franchises, &c., of the said Cincinnati and Mackinaw Railroad Company, situate and being in the counties of Darke, Mercer, and Van Wert, in said State of Ohio, to-wit: The Road Bed and right of way of the said Cincinnati and Mackinaw Railroad Company for a railroad, commencing at a point near Greenville, in Darke County, aforesaid, and extending through the counties of Darke, Mercer, and Van Wert to the town of Van Wert, in said last named county, in the State of Ohio, including the bridges, fixtures, and culverts, railroad ties on the same, or intended for the said road, together with the right of way owned and held by said Company for the construction of its said road, together with all the rights and franchises of said Company for the construction of and maintaining its road in the said State of Ohio, together with all other property real and personal, belonging to said Company, in said State of Ohio, intended to be used in the construction of its said road.

Appraised at Seventeen Thousand Dollars.

Terms of Sale, CASH.

W. A. WESTON,

Receiver, Cin. & Mack. R. R. Co.

C. CALKINS, Attorney; March 23, 1871. 23-3-70, St.

The Railroad Record.

E. D. MANSFIELD, - - - - } Editors
T. WRIGHTSON, - - - - }
A. J. HODDER, - - - - }

CINCINNATI, - THURSDAY, MAY 4, 1871

The Railroad Record,

PUBLISHED EVERY THURSDAY MORNING,

By Wrightson & Co.,

OFFICE—No. 167 Walnut Street

SUBSCRIPTIONS—\$3 per annum in advance.

ADVERTISEMENTS.

A square is the space occupied by ten lines of Nonpareil.

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WRIGHTSON & CO., Prop'r's

The Chesapeake & Ohio Railroad Connection.

We have written so much upon this subject, that we are pleased to publish the views of any other party, and therefore cheerfully give place to Mr. Langley's letter.

What Mr. L. says of the route he defines is undoubtedly correct, and we are ready, just as soon as it can be brought under a vigorous and strong organization, to give it our best support.

Hitherto we have advocated no special route for this connection (though three or four have been presented); because they are all good lines, and unfortunately all in about the same stagnant condition. The Hillsboro route has been kept before our people, and we have therefore spoken most about it. We are for the line that shall be the first vitalized, and if Mr. Langley's route becomes that one, we shall support it with all our might and main:

GALLIPOLIS, April 26th, 1871.

EDITORS RAILROAD RECORD:

Gentlemen—I notice frequent remarks in the RECORD in regard to a connection of your city with the Chesapeake & Ohio road by rail, at different points and by different routes, but have seen but little if anything in regard to a route through this place, which is undoubtedly the shortest route by which that company can reach your city from the mouth of Scary on Kanawha river, from which point they start to reach Catlettsburg; thence, I understand, they propose to run through Kentucky and on to Memphis, and possibly cross the river between Catlettsburg and Guyandotte, and run thence to your city and Dayton, though I think such crossing is not yet decided upon.

By reference to your maps you will find that a line from Scary to this point passing from bere south of Centreville, in Raccoon township, Gallia county, to a connection with the Hillsboro road via Symmes creek, and thence to your city, is the shortest route that can be found, and has light grades, and can be cheaply built; then by this route the Chesapeake & Ohio company would have an outlet by our road to Columbus, thence to the lakes, the north-west, &c. And by our road, in connection with the Hillsboro road, your city would have opened to them the mineral field of Jackson, Vinton, Hocking, Perry and Athens counties, by a shorter route than any thing yet opened to them; by which they would receive immense amounts of coal and iron, besides other products of that region, most all of which is indispensable to the comfort and prosperity of your citizens.

We started an engineering party yesterday afternoon to run a line from here to Mr. Trimble's Hillsboro line on Symmes creek, to get the distance over the shortest practicable route, and to get an estimate of the cost of building the road. I had an interview with Mr. Huntington, at Guyandotte, last week, and he gave me all the encouragement for a connection with their road at this point that we could reasonably expect in the present situation of our enterprise. He says they want to reach Memphis through Kentucky, and also want to reach your city and St. Louis, and also through the interior of our State to the north-west via mouth of Kanawha at this point. Would not this be their best point for crossing the river, and from here reaching Columbus and the lakes via our road, and your city via the Hillsboro line, the first 10 to 15 or 20 miles from here running over the same track? It would certainly be the shortest route by many miles, and cost much less money to construct the road, furnish more business, and not have the competition they would necessarily have on the river line, especially for heavy freights. And to become a link in a great through road like the Chesapeake & Ohio, the road should be as short as practicable, and the shorter between given points the less curvature there would be, consequently the faster they could run.

I will take the liberty of sending you a report of C. B. Shaw, C. E. (of 1852), in which you may find some facts of interest. You will find on the first and second pages his remarks on the route from here to Symmes creek, at a point about where Mr. Trimble now strikes it with his Symmes creek survey; but I think we will get a practicable route by the present survey to that point from 1 to 3 miles shorter than he makes via the Rodney route he speaks of in his report.

I have always thought, and yet think, that to your city the Hillsboro road would be almost invaluable, if run into the mineral belt of southern Ohio, to a connection with our

road that will run 40 or 45 m. l.s continuously through beds of coal, in the aggregate 12 to 20 or 25 feet thick, and beds of iron ore from 3 to 7, 10 and 12 feet thick in the aggregate, or to a connection with any other road running in same direction; or if it was extended itself through these mineral beds, to have such a road and such a connection, and also a connection through this end of our road with the Chesapeake & Ohio road, would certainly be a great gain and advantage to your city. We also want a connection through the Hillsboro road with your city, but do not expect the city to aid us to the extent of a dime (though any aid would be thankfully received), but if they would unite and help put the Hillsboro road through to reach our route, and you say as much as the merit of the route will justify you in saying, it will doubtless be a powerful lever with the Chesapeake & Ohio company; and if they adopt this route they will have, as stated above, the shortest, cheapest and best route from Scary to your city via Hillsboro, and the north-west via Columbus, that can be found. And with so advantageous a route fully brought to their notice, I do not think they would ever be induced to ruin a line down to your city along the river, though of course different persons will have their own views of the advantages of the different routes, and no doubt but they will go where their interest leads. We shall push our matters along as fast as circumstances will permit.

Respectfully yours,
W. H. LANGLEY.

The Late Fight at Columbus.

The fight between what were called the "long horns and short horns," in the Ohio Legislature, for the past six weeks, and that closed triumphantly for the "longs," was one of the fiercest and most persistent and bitter contests of the kind ever waged in this State. Nothing like it (in intensity) has occurred in our General Assembly for many years.

But the curious feature of this whole war is, that it was a combination of three hundred millions of capital against six millions—an attack of the New York Central, Lake Shore, C., C. & C., and C., S. & C. roads, represented by an experienced and hitherto successful ring, stimulated by a large margin in the distance, against the little C., H. & D. road, represented by its managers and friends, in which the lesser party completely routed and put *hors de combat* the great Goliath of the East. This is the first stunning blow the gobbling monster has had, and as it comes from our little David of the West, we hope it will "lay him out" as completely as another Eastern Goliath, a long time ago, was similarly done for.

Too much praise can not be awarded to the managers of the C., H. & D., for their pluck

in this encounter, and particularly to Daniel McLaren, the president of the company, who toiled early and late from the first signs of this war to the final discomfiture of his enemies, and whose Gaelic obstinacy and tenacity of purpose gave confidence to his supporters that there was to be no suspension of hostilities, nor kid-gloved fighting, and that the end must be the success that has crowned his efforts.

The Short Line Railroad.

SPRINGFIELD AND CINCINNATI.

The following, from the *Gazette* of the 3d inst., we think reflects the views of our people upon this subject. Let us see how much work will be done by these Short Liners this coming season. There is plenty of time before the meeting of the next Ohio Legislature to nearly or quite complete the grading to Dayton, and then anything that is necessary for the success of this new line (that does not interfere with the rights of other corporations) can undoubtedly be obtained:

"The effort in the Legislature to secure certain privileges at Dayton for the so-called Short Line Railroad failed. This, however, should not prevent the building of the road. There must be room enough at Dayton for the new road, without encroaching upon the rights of the Cincinnati, Hamilton & Dayton company, and if the Short Line company are in earnest, they will no doubt find a way to get through the city of Dayton on their way to Cincinnati.

"It has been hinted, however, that the fight at Columbus was not so much for or against a new road as it was to secure a sharp bargain in a lease of the Cincinnati, Hamilton & Dayton company; that if the so-called Odlin bill had passed, the Short Line would not have been built, but the owners of the C., H. & D. company would have been forced to lease upon terms which can not now be secured; while now that the Odlin bill has been defeated the lease will be consummated upon terms not so favorable to the Shoemaker interest. It would thus appear that the fight at Columbus was not for or against a new road, but a sharp turn in a game for a lease.

"If this version of the contest is incorrect the Short Line will, of course, be built. There is room enough in this city and in Dayton for an independent line, without infringing upon the vested rights of others; and if, therefore, the Short Line shall not be built, the failure of the Odlin bill can not be assigned as a reasonable excuse.

"That it would advance the interests of Cincinnati to have the great New York Central trunk line enter this city over a road of its own is quite clear; but it is equally desirable that the Cincinnati, Hamilton & Dayton road, which has important Western and Northern branches, and also accommodates the Erie road, should also be maintained as a distinct institution. To have all the trunk lines center here upon conditions that will place each upon an absolutely independent footing is important, and any project looking to such a result will be warmly seconded by our citizens."

Commissioner Wright's Report.

2d VOL., 1870.

We have received a serviceably bound and cleanly printed copy of the second volume of Commissioner Wright's reports upon the railroads and telegraphs of Ohio, for the year 1870.

From the cursory examination we have thus far given it, we find that it contains such returns of the railroad and telegraph companies of the State of Ohio as are required by law, for the year ending June 30th, 1870, exhibited in a tabulated form, under proper heads, and with such references as are convenient to the experienced statistician, or necessary to the general reader for the full and proper understanding of the immense amount of information they contain.

These detailed statements are of incalculable value, not only as a check upon the wild ventures or ruinous neglects that continued authority and seclusion from public scrutiny provoke in the minds of some of the managers of these important interests, but as a means of informing the stock and bondholders, and all others who may have investments in these projects, of the condition and value of their property. And it also enables our railway officials to compare their skill in management, and learn from the experience of each other.

Before such exhibits were had, the working of each individual corporation was a sealed book to every other, and in many instances but a cloak to the most outrageous frauds upon the stockholders and creditors, and an imposition upon the public.

There is nothing like thorough ventilation to keep corporations as well as individuals in a high tone of moral and physical health.

Mr Wright prefaces this volume with a summary of complaints and violations of laws, by some of these corporations, according to the requirements of a section of the act creating the office he holds.

The principal of the complaints are:

1st. Rates for transportation of persons and property.

2d. Injuries to railroads.

3d. Speed of trains in towns and cities, occupation of streets and alleys by cars and locomotives, and railroad crossings.

4th. Fencing railroads.

5th. Railroad officers dealing in railway securities, or interested in transportation companies.

6. Heating and lighting cars.

7th. Reports of railroad companies.

Under each of these heads the commissioner makes such remarks as are appropriate, and gives a great deal of valuable information and some most wholesome advice, that both the railroad companies of the State as well as our legislature would do well to consider.

He also treats briefly in this preface, upon the accidents that have occurred upon Ohio railroads, and upon the "Increase or Watering of Stock," a principle he illustrates most admirably, by presenting the results of such an operation in three of the most important companies of the State. He gives a passing but sufficient notice to roads in progress and new companies incorporated during the year, to the question of county and municipal aid to railroad companies, and refers to several communications upon railroad subjects, placed in the appendix, that are from distinguished persons of the State.

These subjects are of especial interest to railroad men. Some of them are the live questions of the profession, and will have to pass through all the stages of discussion before anything like a scientific and settled conclusion is reached. It is time they were passing through this ordeal, hence the commissioner has rendered the State a great service, in giving them an official start.

There is much more in this volume which we would like to notice in this review, but must pass for the present. We expect, however, to refer to it at some other time, not in a general notice, but by making some of the suggestions for improvement, made by Mr. Wright or his correspondents, in railroad affairs, or the statements of some of our leading companies, the texts for future articles in the RECORD.

Mr. Wright merits the thanks of the profession and the railway press, not only of our State but of the country, for the thorough and able manner in which he has done his work. It compares favorably with that of any other State, and must be productive of good results to the great, growing, and we might say absorbing interests such efforts are intended to represent and assist.

THE BALTIMORE & OHIO R. R.—The Baltimore & Ohio road has now a most advantageous communication with the West. From Cumberland, it has three Western extensions. 1. To the Ohio River at Parkersburg, thence through Ohio to Cincinnati, with a branch to Portsmouth. 2. To the Ohio River at Wheeling, and thence to Columbus, Ohio, with a branch to Sandusky, on Lake Erie. 3. To the Ohio River at Pittsburg. From Pittsburg to Chicago it has now under construction an air-line. The trade between Baltimore and Chicago, and through Chicago with the Northwest is daily increasing. The European steamers from Baltimore make that city a competing market for breadstuffs and provisions with New York. Already a large return trade has set in, and dealers in all parts of the West are already finding the Monumental City a good place to buy in. When the road from Pittsburg to Chicago shall be completed, this trade between the two cities will become permanent and extensive.—*Chicago Review*.

There are six millions of real estate owners in the United States, the farmers being four millions of the number.

Cincinnati & Michigan Railroad.

We are pleased to find that the friends of this important scheme are moving with a vigor and earnestness that betokens something more than mere talk.

We know personally some of the leading men in this enterprise, and can vouch for their good faith and zeal in this movement, and as this road would be one among the very best in the North-west, we see no reasons why their efforts should not be successful.

BRADFORD, O., April 28.

According to published notice, representative men along the line of the Cincinnati & Michigan Railroad met at Bradford Junction. The meeting was organized by electing John Sowers, Esq., Chairman, and William Commons and Owen Ellerman, Esqs., Secretaries. The President called on N. P. Guffee, of Mercer county, to explain the business of the meeting as follows: To consider the feasibility of building a railroad from the Michigan State line, running through the counties of Williams, Paulding, Van Wert, Mercer, Darke, Miami and Montgomery to Germantown, and thence to Cincinnati. The road to be extended north to Hillsdale, in Michigan, connecting with the road now running from that point to Mackinaw, and constituting an almost air line from the last named place to Cincinnati. The route had been surveyed and was practicable, and passed through a country of greater resources than any other proposed North and South line. That the main object of the meeting was to take the required steps to raise the stock necessary to build road bed and furnish ties, as incorporated companies were ready to furnish iron and machinery, and build the road, as soon as such stock could be secured. The speaker, in a plain and brief manner, explained the advantages of the line. Other gentlemen made remarks relative to the work, when the meeting took recess until 1 o'clock P. M.

The meeting reconvened at the hour agreed upon, when the subject was again canvassed, and it was decided that the road could and ought to be built. A motion prevailed to appoint a general soliciting committee to procure stock and complete permanent organization. The following gentlemen were selected: N. P. Guffee, K. Alberry and Dr. Murphy, of Mercer county; L. Crager, Reuben Rauch and B. Adleman, of Darke county; J. Sowers, S. L. Hoover, D. R. Rice, C. Ellerman, Geo. Netzeley, I. C. Hall, Dr. A. C. Bobbs, P. Christian, L. Annon and Wm. M. Note, of Miami county; H. M. Turner, S. L. Herr, Eli Deal, Wm. Zeigler, C. Musselman, Dr. J. J. Antrim, C. W. Dunnifer, J. Zehring, D. Rohrer, S. W. Turner and A. B. Tobias, of Montgomery.

N. P. Guffee stated that the counties north of Mercer had already pledged stock enough to build the road through those counties:

The following resolution was adopted:

Resolved, That all stock or donations subscribed be made conditional and payable when the road is built and cars running to the point at which such stock is subscribed; and that the holders of stock subscribed at any point, be authorized to select an agent to hold the subscription papers, not to be delivered to the company until the road is built and cars running to that point.

Upon motion, it was decided to publish the proceedings of the meeting in the **RAILROAD**

RECORD, Cincinnati Gazette and Enquirer, when the meeting adjourned to make room for the committee to effect an organization.

JOHN SOWERS, President.

WM. COMMONS, Secretary.

The Knickerbocker Life.

We call especial attention to the following official statement of the condition of this company. It is made in compliance with a law that requires it to be filed with the Auditor of State, and to be published generally, in order that the company retain its right to do business in Ohio.

It is a most gratifying exhibit.

AUDITOR OF STATE'S OFFICE,
DEPARTMENT OF INSURANCE,
Columbus, April 4, 1871.

It is hereby certified that the Knickerbocker Life Insurance Company, located at New York, in the State of New York, has complied in all respects with the laws of this State relating to Life Insurance Companies for the current year, and has filed in this office a sworn statement by the proper officers thereof, showing its condition and business at the date of such statement (December 31st, 1870), to be as follows:

Amount of Joint Stock or Guarantee Capital paid up.....	\$100,000 00
Aggregate amount of available Assets, including the sum of \$3,842,700 16 in premium notes held by the Company on Policies issued.....	7,398,991 60
Aggregate amount of Liabilities including re-insurance.....	6,744,951 01
Amount of income for the preceding year in cash.....	2,326,485 30
Amount of expenditures for the preceding year in cash.....	1,595,552 01
Amount of Notes used in payment of Losses and Claims during the year.....	64,705 83

In witness whereof, I have hereunto subscribed my name and caused the seal [SEAL] of my office to be affixed, the day and year above written.

Jas. H. GODMAN, Auditor of State.

The *Cleveland Leader*, commenting upon this statement, says:

"Any great corporation, having the interests and investments of so many thousand persons as the 'Knickerbocker' Life Insurance Company, should be guarded and guided by protective laws, and able and honest management. While the recent careful and laborious official examination of New York life insurance companies has been going on, conducted by the able and unbending Insurance Commissioner (Hon. Geo. W. Miller), people have carefully watched its results, and those interested in the 'Knickerbocker Life' have reason to continue their confidence in this staunch, reliable company, which has again complied with the laws regulating life insurance, and again received the official seal of soundness.

"All things considered, no company (of the same age) in the United States has conducted its business upon a lower ratio of expense than the 'Knickerbocker,' and to-day, with its twenty-one thousand members and sixty-two million dollars of insurance, with an annual income of five million dollars (steadily increasing) and agencies well established

throughout the United States who can question that it has not been ably and honorably managed, and in a sound financial condition?

"The liberal features of its policies merit the attention of business men, being non-forfeitable, grace allowed for application of paid up values, no restriction upon travel, suicide does not forfeit the policy, and dividends are paid annually upon the 'contribution plan.' Other liberal features, not incorporated in our old policies, have been added, which do not in the least compromise the soundness of the company, and greatly advance the interests of the insurer.

Krupp's Cast Steel Rifled Guns.

With the beginning of the American rebellion commenced a comparatively new era in the science of war. Old notions began to be obliterated, and the Christianity of warfare to pass away like the morning dew. In olden times the tender conscience was wounded at the idea of shooting with intent to kill. The selection of skilled men, armed with choice weapons, to act as sharp shooters, instructed to "pick off" the officers, was horrified into direct murder, and all firing must be done in volleys, and at random (except in a charge) to constitute Christian warfare.

The truth is, there is no Christianity in warfare at all. Hence, it is all nonsense to talk about conducting a war on Christian principles.

The true science of war is, to destroy the enemy as speedily and as effectually as possible, with the least cost, injury, or loss to one's self. This is the very *acme* of the profession.

To the perfection of this science, no one country has contributed all the approved inventions. We propose, however, in this connection to speak only of one, the Krupp Cast Steel Breech-loading Gun. To show the superiority of these guns over others, we give the following extract from a private circular of Thomas Prosser & Son, of New York, the American agents of the house of Fried. Krupp, of Prussia. It says:

"The largest Krupp Guns used at the siege of Paris were twenty-four pounders, or as they are now called, fifteen centimetres (about six inches). The weight of this gun is about six thousand pounds; charge of powder, four and a half to five and a half pounds; weight of projectile, fifty-five to sixty pounds. The French forts were armed with the largest marine guns of the French fleet, but the accuracy of the twenty-four pounders soon dismounted them, piercing the casemates and reducing Fort d'Issy to a heap of ruins. During the entire siege operations, as well as in the artillery fights, the loss of the Germans was insignificant.

	Weight of Gun.....	Weight of Projectile.....	Weight of Charge of Powder.....	Foot-tons per square inch of Section of Projectile.....
	lbs.	lbs.	lbs.	
24 P'd'r Siege Artillery,	6,000	55 to 60	4 1/2 to 5 1/2	
24 P'd'r M. Hoop Gun,	8,000	77	15	47.70
11 Inch Krupp Gun.....	55,000	495	83	74.70
15 Inch Rodman Gun.....	39,800	450	60 to 100	26. to 43.

"Smooth bore guns are of little use against iron-clad ships. The above table shows that the penetrating power of a 15-inch Rodman Gun, weighing 39,000 lbs., with 60 lbs. of powder, is equal to 26.80 foot-tons, and with 100 lbs. of powder, equal to 43.00 foot-tons, while the 24 pounder Krupp Gun, weighing only 8,000 lbs., and with only 15 lbs. of powder is equal to 47.70 foot tons. A ship armed with this light weapon would be more than a match for any vessel with as many 15-inch guns on board as it could carry.

"The latest competitive trial of Steel Guns took place on the Steinfeld at Vienna, in October, 1870, between a Krupp 9-inch Breech-loading Gun and a 9-inch Armstrong Muzzle-loader.

"After 111 rounds (with prismatic powder), the Armstrong Gun showed a split 26 inches in length, and was declared to be completely unfit for service.

"The Krupp Gun fired in the same time 210 rounds—the Gun and the breech-loading apparatus being pronounced perfect at the close of the trial."

CHINESE LABOR IN COTTON MILLS.—An experiment with Chinese labor in the manufacture of cotton goods has been tried at Baton Rouge, Louisiana, which promises to lead to important results. The Superintendent of the State Penitentiary in that city, Mr. S. L. James, finding that the demand for the cotton goods manufactured by the convict labor under his direction exceeded the supply, conceived the idea of doubling the production of the Penitentiary workshops by employing Chinese to work the looms at night. He accordingly secured a force of one hundred and sixty Chinese, lately employed in building one of the Alabama railroads, and set them to work, and the ease and rapidity with which they learned the business surprised even the originator of the idea. He reports that they became experts in a few weeks, and that they are now fully as good as any workmen in this branch of industry whom he has ever seen. They are exceedingly diligent, always appear to be absorbed in their employment and seem to prefer working at the looms and spinning machines to any other form of employment. They are paid twenty-two dollars a month in gold, and even at these wages Mr. James considers them quite as cheap as convict labor. The results of this experiment are attracting much attention throughout the South, and we understand that several cotton mills are projected in different localities in which white labor will be employed by day and Chinese labor at night. Should these plans be carried out, there is reason to believe that such enterprises would, if well managed, prove largely and permanently profitable. By keeping mills in constant operation a much larger production is possible with a given investment of capital in machinery and appliances, than if such machinery is worked only eleven hours out of twenty-four, and while the prices of goods thus produced may be lowered, the profits of manufacture will be increased. The idea of Mr. James is a good one, and the fact that the cloths manufactured at the Baton Rouge Penitentiary find an immediate and profitable market, shows that the experiment may be repeated elsewhere with advantage to both the producers of cotton and the consumers of cotton fabrics.

Alabama, which in 1860 was the thirteenth State, as regards population, is now the sixteenth, and Mississippi, which was the fourteenth, is now the eighteenth.

Our Schools Generally, and in Ohio Particularly.

The heading of this article naturally leaves out colleges and universities. In common parlance, when we speak of common schools and academies, the latter means essentially the same as those which, for the most part, in the North are called high schools. It is of the effects and benefits principally of common schools that I purpose to write in this essay, not excluding, however, some references to the advantages of academies.

Common schools and academies are essential means of moral and mental culture. They are a prerequisite to college education, and in many instances have actually, with the aid of self improvement, resulted in the highest efforts of genius and some of the grandest inventions of science. Robert Fulton had no higher than an academical education, yet he invented the steamboat. Nor had Oliver Evans any higher education than that of an academy, except as he educated himself from what he had learned at one, yet he was the author of several important steam inventions; that, for instance, called the elevator, for lifting barrels of flour, &c., into the upper stories of warehouses; also of other steam inventions for mills and the movement of flour barrels, &c., in other directions, called the conveyer, the drill, the hopper-boy, and the descender. He proposed to Stephen Girard to make a railroad across New Jersey, if Mr. Girard would furnish the necessary capital, but Mr. Girard regarded the idea as a mere hallucination, and in a conversation with his own attorney, William J. Duane, characterized Mr. Evans for so doing as "one visionary." But Mr. Girard was himself a strong proof that a common school education, with industry, economy, honesty, perseverance, and a more than ordinary native capacity, may qualify a man to become immensely rich, therefore, of course, to acquire a less degree of wealth. George Stephenson, who was the inventor of railroads, near the time when Oliver Evans discovered their practicability, had only a common school education (scarcely that in the ordinary degree). But he availed himself of it to extend his knowledge by the perusal of useful books, principally of those which would enlighten him in questions of mechanism, for which he had natural capacity of the first class. His leisure hours were often occupied with these, and to him sleep was often coy, when intent on mastering their reasonings and discussions. Thus, at thirty years of age, the boy who had tended cows at eight years of age had become one of the greatest practical mechanics, the mender of clocks needing repairs, the practical solver of difficulties arising in the excavation of coal pits, and the maker of a fit steam engine for a miniature railway eight miles long; in short, the accomplished steam engineer, who knew more about the steam engine

than any living man of equal years. Thenceforward his march was by an easy progression to the very foremost position as a steam engineer. Occasion soon arose for the exercise of his great powers. Liverpool and Manchester had expanded under the inventions of Arkwright, Compton and Hargraves for the manufacture of cotton, until the ordinary modes of transporting merchandise of various kinds between them did not suffice to dispose of the rapid production of the Manchester mills and the accumulated merchandise of the great commercial city. There was a man at hand whose God-given genius had received its first high improvement from a common school, which was the basis of his self culture, and who was equal to the task of removing the obstacles to further commercial and mechanical progress. A company was formed to construct a railway between Liverpool and Manchester. The fame of George Stephenson had reached them. He conferred with some of the directors, of whom Mr. Cropper, a Quaker gentleman, was one. The number of miles between Liverpool and Manchester is sixty, enough, on such ground—for some of it was truly difficult—to solve the most important questions in civil engineering arising on railroads, and task the faculties of a first class engineer, while not so great as to render tedious the completion of the work. Four years of laborious exertion and eminent skill finished its construction.

A question of intense interest arose in this novel enterprise, and one greatly hazardous in the view of men much less of engineers than Stephenson. All of the engineers opposed the theory of Stephenson, that in any railroad of considerable length the locomotive engine alone could ensure success. Even Mr. Cropper, highly as he estimated him, opposed him in this. But at length, by the force of his facts and reasoning, Mr. Cropper was won over, and having a very great pecuniary interest in the railway his accession to Stephenson's opinion carried the day in its favor. The stationary engine, the pet of the majority, was rejected, and the locomotive adopted.

This was one great turning point secured. It was to engineering success what the battle of the Metaurus was to the Romans against the Carthaginians in the second Punic war. Another remained. It was, if effectively answered, "to win the long disputed world on Zama's fatal field." It required gigantic intellectual power and energy; they were present in the person of George Stephenson. This turning point or question was, how to get an engine of sufficient power to bear a remunerative weight and propel it with adequate rapidity. The furnishing of one of this class was thrown open to competition. A day was fixed for the trial of such engines as might be presented. The engine was to be capable of moving a moderate number of tons at the rate of twelve miles an hour. At the appointed

day four principal competitors appeared; Stephenson's engine obtained the prize. This engine averaged on the trial 14 miles an hour and during a certain part of it, went up as high as 29 miles an hour. There was no nice balancing the scales to know who had succeeded, Stephenson had distanced all competition. When Mr. Cropper saw the results, he lifted up his hands in admiration and exclaimed, "Now, indeed, is George Stephenson delivered."

And then and there, as well as on numerous occasions elsewhere, were proved the grand consequences which may flow from a common school education. The first great light in the mind of George Stephenson was derived from such an education. It was from that seemingly low pedestal that he climbed the high "where fame's proud temple shines afar." Ages might have passed but for the common school, ere railroads would have been invented, but common school education came along and found the boy, on whom it poured its anointing oil, and lo, he becomes the king of engineers. He exerted while alive, a world-wide beneficence, and acquired a world-wide fame. They are destined to increase and not to diminish. Columbus discovered America, and in every age he shall be celebrated; but George Stephenson is the author of that invention by which the commerce of the world will be revolutionized in favor of America a hundred and fifty years in advance of what would have happened without it. The results were as favorable to his personal as to the interests of mankind. He acquired a large fortune, and a considerable part of it in the middle period of life. But, had I time, I could cite many instances of persons who by the aid of common school education have acquired eminence and opulence.

Boys of Ohio, it is within your power, by attention, industry, economy and propriety of conduct, with the Divine blessing, to obtain like distinction and signal benefits. W. A.

MANUFACTURE OF PERFUMES.—A few years ago nearly all the different kinds of perfume and flavoring extracts were imported principally from France; but we now manufacture almost all that used here, and export considerable quantities besides. The manufacture of these articles is carried on to a greater extent in this city than in any section of the country, and employs a large amount of capital and a great number of work people, principally women and children. Several large concerns have made fortunes on some particular kind of extract which has suited the taste of the public, while others have lost large amounts on something equally as good, but which has failed because of a badly selected name and injudicious advertising. Much of the success of this kind of goods is dependent on the name they bear and the method of putting it before the public. Nearly every person of any note who comes to this country has some kind of perfume named after them, and if they are popular the articles thus named are sure to become so. Nearly every country town of any size has its manufacturer of perfumery, which finds ready sale in its own neighborhood, but the finest kinds are manufactured here, and now take the lead over all kinds, either foreign or domestic.

Dayton & Cincinnati (Tunnel) Railroad.

Cincinnati is celebrated for *dormant* enterprises. Had the "good things" that were suggested for the development of her commercial and industrial resources twenty, twenty-five or thirty years ago by her few sagacious and far-seeing citizens, been adopted and carried forward to completion, our city might to-day have been nearly double its present size, and had quadruple its present general traffic.

Of this character of enterprises is the Southern Railway, advocated by Dr. Drake, Ben. Drake, and others, most of whom have passed away, although some few still remain to witness the same influences defeating this project at the present time that defeated it thirty-five years ago. Its defeat then, and now, it is true, was partially beyond our control; and hence we, as citizens of Cincinnati, are perhaps not wholly responsible for it.

There are others, if not of equal importance, yet at least worthy of the careful and candid consideration and best efforts of every well wisher of our city's prosperity.

Perhaps first among these we might mention a project first suggested by Erasmus Gest, in elaborate articles, published some fifteen or sixteen years ago, for a through connection and grand central depot for all the railroads coming to the city, by means of a tunnel under Sixth street. The depot was to be in the Sixth-street Market Space, as near as possible to the center of the city. Had this work been constructed a vast amount of traffic that has been diverted by routes constructed to avoid the city transfer would have passed over our young railroads, and given them strength that would have enabled them to have at least "held their own," instead of being as they are to day swallowed up by lines that have grown up into vast monopolies by the more favored legislation and aid of other cities. The roads thus built by our own money, and for the purpose of ministering to our own traffic, are being abstracted from our control to swell the commercial importance of other communities.

The Dayton & Cincinnati (Tunnel) Railroad is another very marked example of this class of dormant enterprises of our city. That it was a work of the very first importance to our city every one admitted. But, for causes that we will not now undertake to explain or defend, it has lain dormant for fifteen years or more, with nearly three quarters of a million of money spent on it, the accumulated interest on which, alone, would have more than sufficed to complete the work, and made it not only a financial success, but one of the most important adjuncts to the traffic of the city.

Jealousies and hickerings among leading managers of course sacrificed much of the valuable property of the company, and involved it in the most interminable meshes of the law.

These are all ended now, we are informed, and the company free from all legal difficulties and wholly free from debt. The old stock has been capitalized at a minimum figure, and is to take a "hack seat," and efforts are to be now made to complete the work.

By the construction of this line of railroad greatly increased facilities will be furnished, especially for passenger traffic, not only to the great lines radiating to the north and east, but also for local neighborhood trains for suburban denizens. It will shorten the actual distance on all the lines several miles, and the equated distances more than three times as much as the actual. Crossing no streets, in-

terfering with no great highways, high speed can be maintained into the very depot, instead of the snail pace now required for the great distance through our extended city limits.

The local traffic alone, it seems to us, at the start, would go far toward making it a paying investment, and the natural increase in this class of business must soon make its stock one of the very best in the market.

This enterprise is in new hands, who seem to understand their business, and appear to be determined to accomplish results. We wish them a hearty God speed.—*Cincinnati Chronicle*.

THE FIRST LOCOMOTIVE.—The first locomotive that ever did service in the United States is now lying outside of a foundry at Carbon-dale, Luzerne county. It ought to be preserved somewhere as an interesting relic of the early days of railroading. The following description of its trial, taken from Dr. Hollister's History of the Lackawanna Valley, will be read with interest:

The first locomotive engine introduced and worked in America, was run upon the Delaware and Hudson Railroad, in the year 1828, and Hone's Dale, (named from the late Philip Hone,) offered its friendly glen for the purpose of conducting the experiment. This locomotive, called the "Stourbridge Lion," was built in England, of the best workmanship and material, and most approved pattern of that date. The road passed out of Honesdale by a sharp north-westerly curve, with a moderate grade, and was carried over the Lackawanna by a long hemlock trestling, considered too frail by many to support the great weight of the mysterious looking engine all ready for the hazardous journey.

As the crowd gathered from far and near, expecting that bridge, locomotive and all, would plunge into the stream the moment passage was attempted, no one dared to run the locomotive across the chasm but Major Horatio Allen, who, amid exultation and praise passed over the bridge and a portion of the road in safety. The engine, however, was abandoned, as the slender trestling forming much of the body of the road, sufficiently strong for ordinary cars, was found too feeble for the "weight and wear." Major Allen, in the account of this first trip of a locomotive on this continent, says: "As I placed my hand on the throttle, I was undecided whether I would move slowly or with a fair degree of speed; but believing that the road would prove safe, and preferring, if we did go down, to go down handsomely and without any evidence of timidity, I started with considerable velocity, passed the curve over the creek safely, and was soon out of hearing of the vast assemblage. At the end of two or three miles I reversed the valve and returned without accident, having thus made the first railroad trip by locomotive ever made on the western hemisphere."

INFLUENCE OF IRON ON WATER.—It is not generally known that a few scraps of iron will prevent the bad odor from forming in water left to stand for days and weeks. The metal removes the free oxygen in the water, and thus prevents the oxidation of the organic matter that may be in the water. A better agent for rendering river water sweet and healthy is to employ chloride of iron. A very small quantity suffices to throw down the organic matter and thus to purify water. There are few disinfectants so valuable as the chloride and sulphate of iron, and they ought to be kept about every household. They are equally important to stop bad bleeding from the nose or from cuts.

The Railway Profession.

It is well recognized that vigorous and continued exercise of the bodily functions tends to develop and strengthen the entire muscular system, and that, in analogy to this principle, exercise of the mental functions educates and develops them, not merely in one direction, but in all their powers.

In no other department of busy life, with its thousands of complications and conflicts, is this principle so admirably exemplified and illustrated as in that of railway management. In the hurry, jostle and jar of an exciting business life, with its many cares, anxieties and duties, our railway men, as the rule, stand pre-eminent for their quickness of perception; for methodical habits of thought by which they are enabled to grasp and comprehend at once—at a very glance—the difficulties and perplexities of any given, sudden emergency, and for masterly executive ability in the issue of prompt, efficient instructions in the hour of danger or disaster—be it physical, financial, or political. Many are the men known in this profession who would have made most excellent admirals or generals! We hazard the averment that nine in ten of them would have made better naval or military commanders in our late war, than the same proportion of men taken from any other profession—especially when compared with the “political” generals at whose hands we suffered so much disaster in the outset!

The reason for this is obvious. To illustrate: If a man be kept driving shoe-pegs, exclusively, for years, he will degenerate bodily and mentally into a mere machine—a very dexterous one, it may be, but still nothing better than a shoe peg manipulator. Put that same man in a forge or machine shop and set him to handling ponderous sledges and dealing with intricate and nice machinery, and he will develop all his physique, even if he does not become a peculiarly skillful artisan. So too, let a man be confined to the penny-half-penny dealings and trade of an obscure country grocery, the magnitude of whose operations may be measured by a gill cup and a berring, and such a one if he does not degenerate into an exceedingly small specimen of humanity, will, at any rate, never develop a full-sized, liberal-minded, generous manhood.

Railway men are educated in one of the very best schools for a large mental discipline. Except in the rare instances in which by accidents of fortune, men *inherit*, as it were, a commanding position in the profession (and then, they find themselves compelled to deter to the opinions and advice of others of experience), the great majority have ascended, by successive and laborious steps, the ladder which leads from the counting-room stool in the railway business office to commanding positions in great corporations, where their influence is felt to be almost national in extent and importance.

It is in such a school that such men are educated and developed as Thomson, Scott, Garrett, Vanderbilt, Gould, J. G. Smith, Ogden, Jay, Tracy, Douglas, Blackstone, Phillips, Parsons, Dunlap, McCullough, the lamented Turner, and a host of others of whom our country may well feel proud, and who would be its pride in any profession. Such circumstances and surroundings can not fail of exerting their natural and valuable influences upon mind and character—habits and command of thought. It is not every one, to be sure, who can attain such pre-eminence. A man must possess the native, congenital

material to be cultivated and wrought upon, or all the training of a life time will prove fruitless.

Accordingly we are well prepared to find, as we do, that our distinguished railway managers are, as a class, men of fine native abilities. We find them to be, almost without exception, possessed of vigorous intellects, whose processes are peculiarly rapid and accurate; of comprehensive, liberal views—enterprising and extensive purposes—and generous emotions; and these excellent faculties and characteristics are not confined to the management of their roads alone—they are carried with them into all their walks in life and relations to their fellow men.

PURCHASING TICKETS.—How very annoying it is for one to stand near a place to purchase a ticket for some railroad station, or some entertainment, and have a person stand directly in front of you who neither knows where he wants to go, or if to a show, what part of the house he desires to sit, and a few general suggestions will not come amiss in regard to the matter. If at a railroad ticket office, get your money ready promptly—if in script, lay it out so that it can be easily counted; await your turn, and then hand it to the ticket seller, stating where you want to go and how many tickets you want. He will thus be enabled to pass you your tickets at the same time he takes your money, and saving time; but if you want to ask him for a ticket, which he gets, and then you are obliged to feel in your pockets to get the money, it causes delay to many others who are waiting to purchase also. Put your ticket in some convenient place, so that when you are called upon to present it to the conductor, you can get it at once, and not make that officer wait for you to fumble over all your pockets before being able to find it. If you find it necessary to pay your fare on the cars, give the officer who collects the same as near the right sum as possible, as they at best have not any too much time between stations to make change.

In visiting an entertainment, arrange your money so that it can be counted readily, pass up your money and state how many seats you want and where you wish to sit, and by the time you have finished your instructions, the tickets are before you. How many have grown impatient to see persons occupy the attention of a ticket-seller until they could get their money out of a fob-pocket, all wadded up in a heap thus making many wait for his neglect. After purchasing your tickets, and coupons are attached for reserving seats, one can readily separate them before reaching the door where the tickets are taken up, when the tickets can be handed quickly over to the door-keeper, thus avoiding a short stoppage at the door for the door-keeper to tear off its coupons. All these little stoppages take time, and are many times a great annoyance, and can be readily remedied by observing the suggestions just given.

When you are passing over a railroad next time, just think that you are on a line of a connecting net work the sum total of whose meshes is 50,000 miles, that the total cost of this network distributed to our whole people would give \$50 to every man, woman and child in the land; that the earnings of these iron meshes annually would allow each individual \$11, counting our population forty millions; that they carry 125,000,000 tons of freight; that the value of this whole tonnage equals \$12,500,000,000—remember these things and you will form no mean idea of the magnitude of our railroad system. Remember, too, that every mile of road adds five times its own cost to the aggregate wealth of the country.

Improvement of Railway Property.

One method of making railway property more productive is by a reduction of the rates of speed of trains, another is by making the price of tickets correspond with the speed of the trains. On most of the roads of this country there is no difference in the price of a passage between a fast and a slow train. Manifestly there should be. The difference in the wear and tear of an express train going thirty-five or forty miles to the hour and one going twenty miles, is very great, and this difference in the greater wear of track and rolling stock should, as nearly as may be, be represented in the price of passage. Goods sent by fast trains should pay a higher rate likewise than if sent by the regular slow trains for the same reasons, i. e. they cost more to carry. One of our English contemporaries deprecating the tendency to increase the speed of trains without a corresponding increase in the receipts says:

“There is one way of improving railway property which requires neither the expenditure of more capital nor any alteration or addition to the line of works. It would have a most potent influence on the rate of dividend, would be easy of accomplishment, would tend greatly to the prevention of accidents, and would therefore tend to promote traffic while reducing working expenses prodigiously. A wonderful cure, verily! What may it be? It is an expedient as simple as effective. It is only to reduce the speed of trains. We have long pointed to this remedy. But, simple as it is, it is a most difficult thing to do. If any one were to invent a means of carrying on the war of trains in a more intense degree, he might be listened to with eagerness, but the man who counsels peace and good will toward neighbors has nothing new to propose, while he places himself in direct opposition to the active measures of the day. The very topmost speed is that which each company strives to gain. If, however, moderation would only take the place of competition as a rule of conduct in railway matters, the result would be an immense benefit to railway proprietors. The life of an engine and the life of a rail, nay, the life of a passenger would be lengthened considerably, and while railway companies thus saved large sums in working expenditure, the public would be accommodated in a more sensible manner.—*Times*.”

RAILROAD CAR AXLES.—In view of the results of a recent accident in England, caused by the breaking of a railway car axle from the unsoundness of the material, by which eighteen persons lost their lives, Sir Joseph Whitworth, the eminent English mechanician, urges the great importance of the use of every possible means for detecting the unsoundness of the iron used in axles of railway carriages. As the best method for this purpose, he advises the drilling of a hole through the center of its axis for its entire length, thus opening to inspection and examination that part of the material which in the case of ordinary manufacture, is most liable to flaws. The hole should be about one inch in diameter, and with suitable mechanical arrangements might be drilled at an average cost of thirty-seven cents an axle. With the outside turned and the inside thus exposed to view, a serious flaw in the axle, which is only about four and a half inches in diameter could hardly escape discovery. This plan will also diminish the tendency of the axle to get heated, by removing the material near the neutral axis, and, under the circumstances, would reduce the internal strain, and thus render the axle safe.

KANSAS PACIFIC R. R.—This company propose to carry excursion parties over the road at the following rates for the year, from Leavenworth or Kansas City to the following points and return.

Mr. Beverly R. Keim, the recently appointed General Ticket and Passenger Agent, of the road, who by his energetic efforts and influence has contributed to this consummation so much to be desired, has recently issued a circular from which the rates are taken:

PERSONS.

	For 25 to 50.	For 50 to 100.	For over 100.
Lawrence, Kansas...	\$ 3 00	\$ 3 00	\$ 2 50
Topeka, Kansas.....	5 25	5 00	4 50
Wamego, Kansas...	8 25	8 00	7 00
Junction City, Kan.	10 25	10 00	9 00
Abilene, Kansas....	11 75	11 00	10 00
Brinkville, Kansas.	14 00	13 00	12 00
Ellis, Kansas.....	20 00	18 00	16 00
Wallace, Kansas....	26 00	24 00	22 00
Carson, Colorado...	29 00	27 00	25 00
Hugo, Colorado.....	32 00	30 00	28 00
Denver, Colorado...	50 00	45 00	40 00

Excursion Parties to leave Kansas City or Leavenworth in a body. Tickets good for 30 days, but extended to 60 if requested. Excursionists can return on any passenger train. The above rates are for passage only; sleeping cars and meals extra—but at such reduced prices as to make it a cheap and at the same time luxurious trip to any who can afford to travel at all. This is a wise as well as very liberal step in advance taken by the new agent of this popular company, and it needs no arguments to convince us that the proposition will be largely accepted.

BALTIMORE & OHIO R. R.—Track-laying was completed on Monday, Mr. B. H. Latrobe, Chief Engineer, and former President, driving the last nail at Mineral Point. The first train immediately proceeded to Cumberland by a temporary road over Brook tunnel, which is not yet completed. A correspondent says:

"The total length of the road from Pittsburg to Baltimore is 325 miles; the highest grade, 50 feet to the mile. Express trains are expected to make the distance from Pittsburg to Washington in ten hours, via the Point of Rocks route. When completed, the road will have cost \$9,000,000. This company has for years been struggling under many disadvantages, pecuniary and legal. Five years ago, rival interests were brought to bear, and an act passed the Pennsylvania Legislature forfeiting its charter for 'abuse and misuse of its corporate franchise.' This was the crisis in the history of the road, the forfeiture of the charter being considered oppressive, and stirred up the friends of the road and increased its energy. After a long struggle the nullifying act was repealed and the company restored to its franchises, and the city of Baltimore and the Baltimore & Ohio road then took an active interest in its behalf, subscribing largely to its stock, and through the active co-operation of President Garrett its early completion was assured. Since that time, President W. O. Hughart has pushed the road with extraordinary vigor.

"Through passenger trains commence running next Monday."

A report from the mining district near Salt Lake says that there will be 2,000 tons of silver ore forthcoming during the approaching summer.

ARTIFICIAL STONE.—We have hitherto so frequently spoken of the Ransome artificial stone that any description of its nature or mode of preparation is unnecessary here. We note, however, its introduction to use in this country, not as one might naturally suppose, in the cities of the East, but in those of the Pacific slope. Among the structures there being constructed of the new building material is a church in San Francisco. Among the minor uses to which it is applied may be mentioned a front for a church at Benicia, and decorations for cemeteries at other places. Although these items show no very extended applications, they serve to illustrate the appreciation which the material has met with on the coast for building purposes. Another and quite different purpose is also subserved by the artificial stone in the manufacture of grindstones, one of which for the California file-works weighs one and one-half tons.

We are not aware that the Ransome stone has been tried on the Atlantic coast, and have no data whereby to compare it with the dozen, more or less, of artificial building stones brought forward and lauded within one-half that number of years past. But it is quite certain that a superior material of the kind is needed in the architectural and engineering practice of the day, and it is time that such was forthcoming, or, if already produced, made manifest in practical form. The *beton coignet* for bridges and monoliths, the Ransome stone for ornaments and building blocks, the chloride of magnesium cement for the same purpose, to say nothing of those based upon the employment of oxalate of lime and similar substances for binding sand into solid blocks, have each their advantage, and, it is to be presumed, their drawbacks, but none appear to have met with the approval from our engineers required to insure their tangible and undisputed success.—*American Artisan.*

PRESERVING WOOD.—Here is the latest project for preserving wood from emacausis. Whether it is better than the majority among scores of plans proposed for the same purpose is not absolutely manifest at first sight. The inventor cuts the wood into two or more equal parts or slabs, boring them at equal distances to receive the trenails to unite them, and immersing the said slabs in a solution of coal-tar and powdered charcoal, either hot or cold, in equal or unequal parts, which not only thoroughly impregnates the slabs with carbon, but coats the surface with an adhesive material, so that, when put together, their adjacent sides will adhere to each other, and form interior partitions or walls of antiseptic or preservative agents extending from one end of each slab to the other; he then unites these slabs by trenails or dowl-pins in such manner as to clinch them as firmly and solidly as if they were of a single piece. The timber thus prepared is immersed in a solution consisting of asphaltum or mineral pitch, 80 parts; sulphur, 5 parts; arsenic, 5 parts; coal-tar, 5 parts; powdered charcoal, 5 parts, aggregating 100 parts.—*American Artisan.*

—The Railway Companies of Great Britain during 1870 paid \$1,558,575 as compensation for injuries suffered on their roads. Of this amount the Great Northern Railway paid \$140,000; the Great Western, \$100,000; the Lancashire and Yorkshire, \$97,900; the Midland, \$124,940; the London and Northwestern, \$369,025, and the London, Brighton & South Coast, \$237,205.

—The Lake Shore and Michigan Southern Railroad Company earned in March, \$1,301,000. This is \$135,000 ahead of the same month last year. For the three months of the calendar year, January, February and March, the earnings are \$385,000 ahead of last year.

FIBROUS vs. GRANULAR IRON.—The following is an extract from a paper recently read before the American Society of Civil Engineers, by J. Dutton Steele: "some years since an experiment was made under my observation bearing upon this point: Rails made of fibrous and granular iron were laid alternately upon a heavy freight-bearing road; at the end of six months, the fibrous heads showed the most marks of wear; at the end of twelve months, the granular heads began to break up, and the result was that the soft, fibrous rail wore out two of the granular. In the early railroad experience, a patent was taken out in England for making the heads of rails of granular iron, and at least two patents have since been taken out in this country for the same object, but all with the same result—all have passed into oblivion under the test of practice. There are several problems in the wear of rails which may be worthy of note. We all remember what a run the double-headed rail had in England, and how signal has been its failure; the first head subjected to the action of the wheels became granulated, and its tensile strength destroyed, so that when the rails were inverted they broke. True to the same principle, we find that any cause which changes the position of rails in the tracks, so as to alter the bearing of the wheels upon them, causes their destruction. If they are reversed side for side to the flanges, they wear out quickly, and even if they are taken up from one point in the road and laid down in another, by which means the bearing of the wheels upon them is, of necessity, more or less changed, the granulated surface is broken up, and their durability is decreased."

GROWTH OF IRON INTEREST IN THE UNITED STATES.—In 1810 the entire amount of pig iron made in the United States was 54,000 tons. In 1869 it amounted to nearly 2,000,000 tons. Our first ton of railroad iron was rolled out in 1844, while in 1869 the interest had increased to 600,000 tons, one-half being produced in Pennsylvania and one sixth in New York. The Lake Superior iron district, in 1856, shipped 7,000 tons of ore, but without making a single ton of pig iron; but in 1869, the shipments had increased to 633,238 tons of ore in addition to 39,000 tons of pig iron. The entire production for thirty years, including 1869, was, of ore, 3,000,000 tons, of pig iron, 400,000 tons. And, as to quality, this latter is said to be superior to three-fourths of that manufactured in England.

ROLLING RAILWAY AXLES.—A communication was recently made to the British Association upon a method for shaping railway axles by rolling pressure, instead of by hammering, the result being accomplished in two minutes, instead of half an hour, as required by the usual method; the axle at the same time being not only superior in quality, but more uniform in size, and of course capable of being produced more cheaply. The machine consists of three rollers, regulated so as gradually to press more closely together, thus reducing the diameter of the bar, and extending its length until shaped to the size required. Axles of any length can be rolled in this manner with collars at any part. The rollers are geared to revolve in all the same direction, their friction imparting motion to the axle. It was thought by the author of the communication that the rolling process would tend to obviate those flaws in the axles which so frequently cause disasters on railways.

The bullion product for 1869 was \$63,500,000.

WIRE ROPE.—This class of rope now enters very largely into the rigging of vessels for certain portions, of which it is much better suited than that made of hemp, such as for fore-and-aft stays, extra preventer stays, and all places where elasticity does not need to be combined with strength. Coal mines and all kinds of deep shafts are generally fitted with wire cables for hoisting and lowering heavy bodies of ore and sending down men. While this kind of rope remains new it is much better for mere strength than any other kind, but, as soon as it begins to wear, it requires renewal sooner than hemp; this arises from the extreme difficulty of laying up so stiff a material as wire evenly, so that each wire shall take an equal strain, and unless each strand of any kind of rope is evenly laid in, the rope will soon wear out. For this reason wire rope suddenly parts, when to all appearances from the outside, it is in good condition. Hemp rope, when properly made, wears from the outside, but wire rope from the inside, and it consequently gives no warning when used up. Many of the ships built in these days are rigged with wire rigging when first built, but when the time arrives for re-rigging hemp is almost universally used, as from its elastic qualities it is not found to strain the hull so badly when the vessel is rolling in a sea way. Iron ships' wire rigging is much the best, and is very generally used both in this country and abroad. One or two factories in this city and Brooklyn are now doing a very good business in this line, and make any length to order which is a great convenience to consumers.

NATAL COTTON.—Eight bales of Natal cotton have arrived in Liverpool from port Natal, via London, shipped by Mr. G. W. Baker, who has taken an interest in the cultivation and shipment of cotton from the Natal district. Very little of this cotton has yet found its way to Liverpool, but occasional small parcels have been sold in the London market. The cotton is rather brown in color and of regular staple, considerably shorter than American, but finer and of greater length than the ordinary African cotton. This parcel was sold at 8½d. per lb., and it is probable that if the cotton arrived here in quantity it would find its way into consumption at ½ to 1d. under the price of middling American.—*Manchester Examiner.*

A NEW MODE OF EVOLVING LIGHT.—Mr. Andrew Pritchard writes to "Nature" as follows: "A singular phenomenon of the evolution of light has been recently observed by me. By tearing sharply a piece of twilled calico into strips in a room well guarded from light, a perceptible luminosity was clearly distinguishable, which appeared at its maximum at the final parting of the fabric. This phenomenon is exceedingly well marked in dry, new calico, and appears to me due to the dressing, as after being washed no light is evolved. Whether attributable to electricity, phosphorescence, or fluorescence, I leave for further investigation. The light appears similar to that produced on breaking a lump of sugar in the dark. So far as I can ascertain, the phenomenon of light being evolved on tearing a fabric is new.

The Southern States are beginning to cultivate China grass, to be used as a substitute for silk. A machine and process for its separation have already been patented. The Louisiana planters have raised the most of this grass; but they sell it in London, where it is worked into what are called Japanese silks.

In the valley of the Upper Red river and its tributaries there is an abundance of the best quality of black walnut timber, such as is used in the manufacture of furniture.

The conjoined capital of all the banking houses of the Rothschilds in London, Paris, Frankfurt and Vienna is said to be, in our money, not less than \$500,000,000.

It costs \$2,000,000 to build and \$375,000 a year to run a first class American naval vessel.

THE RAILROAD CAZETTE, published in Chicago, by A. N. KELLOGG, is a Weekly Illustrated Journal of 24 pages, as large as those of *Every Saturday*.

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The Sun.

CHARLES A. DANA, Editor.

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7-30 GOLD LOAN

OF THE

Northern Pacific Railroad

RAPID PROGRESS OF THE WORK.

The building of the Northern Pacific Railroad, (begun July last), is being pushed forward with great energy from both extremities of the line. Several thousand men are employed in Minnesota and on the Pacific coast. The grade is nearly completed 26½ miles westward from Lake Superior; trains are running over 130 miles of finished road, and track laying is rapidly progressing toward the eastern border of Dakota. Including its purchase of the St. Paul & Pacific Road, the Northern Pacific Company now has 413 miles of completed road, and by September next this will be increased to at least 560.

A Good Investment. Jay Cooke & Co. are now selling, and unhesitatingly recommend as a Profitable and perfectly Safe investment, the First Mortgage Land Grant Gold Bonds of the Northern Pacific Railroad Company. They have 30 years to run, bear Seven and Three-Tenths per cent. gold interest (more than 8 per cent. currency) and are secured by first and only mortgage on the ENTIRE ROAD AND ITS EQUIPMENTS, and also, as fast as the Road is completed on

23,000 Acres of Land to every mile of track, or 500 Acres for each \$1,000 Bond. They are exempt from U. S. Tax; Principal and Interest are payable in Gold; Denominations: Coupons, \$100 to \$1,000; Registered, \$50 to \$10,000.

Lands for Bonds. Northern Pacific 7-30's are at all times receivable at TEN PER CENT. ABOVE PAR, in exchange for the Company's Lands, at their lowest cash price. This renders them practically INTEREST BEARING LAND WARRANTS.

Sinking Fund. The proceeds of all sales of Lands are required to be devoted to the re-purchase and cancellation of the First Mortgage Bonds of the Company. The Land Grant of the Road exceeds Fifty Million Acres. This Immense Sinking Fund will undoubtedly cancel the principal of the Company's bonded debt before it falls due. With their ample security and high rate of interest, there is no investment, accessible to the people, which is more PROFITABLE OR SAFE.

Exchanging U. S. Five-Twenties. The success of the New Government 5 per cent. Loan will compel the early surrender of United States 6 per cents. Many holders of Five-Twenties are now exchanging them for Northern Pacific Seven-Thirties, thus realizing a handsome profit, and greatly increasing their yearly income.

Other Securities.—All marketable Stocks and Bonds will be received at their highest current price in exchange for Northern Pacific Seven-Thirties. Express checks on Money or Bonds received, and on Seven-Thirties sent in return will be paid by the Financial Agents. Full information, maps, pamphlets, &c., can be obtained on application at any agency, or from the undersigned.

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RECEIVER'S SALE.

Jacob T. Martz, Receiver of the Cincinnati and Mackinaw Railroad Company, plaintiff,

vs.

The Road Bed, &c., of said Railroad Company.

The State of Ohio, Darke County Common Pleas, No. 3,280.

By virtue of an alias order of sale made by the Court of Common Pleas, within and for the county of Darke, and State of Ohio, at the June Term, A. D. 1886, of said Court, in the above entitled case, and to me, as Receiver, appointed by said Court, of the said Cincinnati and Mackinaw Railroad Company, issued and directed, I will sell at public outcry, at the door of the Court-house, in Greenville, in said County of Darke, on

SATURDAY, MAY 6, 1871,

at the hour of 2 o'clock, P. M., of said day, the following described property, rights, franchises, &c., of the said Cincinnati and Mackinaw Railroad Company, situate and being in the counties of Darke, Mercer, and Van Wert, in said State of Ohio, to-wit: The Road Bed and right of way of the said Cincinnati and Mackinaw Railroad Company for a railroad, commencing at a point near Greenville, in Darke County, aforesaid, and extending through the counties of Darke, Mercer, and Van Wert to the town of Van Wert, in said last named county, in the State of Ohio, including the bridges, fixtures, and culverts, railroad ties on the same, or intended for the said road, together with the right of way owned and held by said Company for the construction of its said road, together with all the rights and franchises of said Company for the construction of and maintaining its road in the said State of Ohio, together with all other property real and personal, belonging to said Company, in said State of Ohio, intended to be used in the construction of its said road.

Appraised at Seventeen Thousand Dollars.
Terms of Sale, CASH.

W. A. WESTON,
Receiver, Cin. & Mack. R. R. Co.
C. CALKINS Attorney; March 23, 1871. 23-3-70, St.

The Railroad Record.

E. D. MANSFIELD, - - - - - } Editors
T. WRIGHTSON, - - - - - }
A. J. HODDER, - - - - - }

CINCINNATI, - THURSDAY, MAY 11, 1871

The Railroad Record,

PUBLISHED EVERY THURSDAY MORNING,

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WRIGHTSON & CO., Prop'r's

Coal Transportation by the Tunnel, and Cheap Coal for the People.

We have in several articles made clear certain things of great importance to the future of this city. Among them are the following:

1. That if Cincinnati grows, (as it heretofore has done,) in the ratio of Philadelphia, and as we know from precisely the same causes, Cincinnati will have in ten years (1880) 420,000 people, and in twenty years (1890) 650,000. But this growth must be the result of manufacturing industry and railroad facilities.

2. That of a population (say of 500,000 in 1882) 200,000 must be beyond the crest of the northern hills. We need no argument to prove this beyond what we see with our eyes. Look at it. There are Walnut Hills, Mt. Auburn, Corryville, Avondale, Clifton, Madisonville and Norwood, growing more rapidly than any part of Cincinnati. Take as an evidence the churches. Those suburbs together have 16 churches, which shows, perhaps plainer than any other sign, that the people are moving rapidly over the hills. Now where are they going to get coal? If we suppose that coal is to be carted (as it now is in the city below the hills) up those hills to the consumers, every bushel of it, then it will cost more to carry it from the river to the consumer, than it will to carry it by railroad from Sunday Creek mines to the city. We shall not go into details here; but it is obvious to one who makes this calculation. The railroad will be largely and profitably paid at five cents a bushel, with properly constructed cars, from Sunday Creek to the tunnel. Now let us consider this question a moment.

3. We showed that the cost of the tunnel and road to Sharon (full for the best construction) complete, would be \$1,200,000. From Sharon to Morrow, say 20 miles, made in the most perfect manner, \$1,000,000. From Morrow to New Lexington (the Wilmington road) is already constructed and belongs to the Pennsylvania company. From New Lexington to the Great Vein, (Sunday Creek) is now constructing by the Atlantic and Lake Erie Company, and may be put down at \$800,000. Now in order to show what may be done, we will suppose these companies act together (as it is clearly their interest to do,) and then see what is the result.

The capital employed in the railroads may be estimated as follows:

Tunnel road.....	\$1,200,000
Sharon to Morrow.....	1,000,000
Wilmington road.....	2,000,000
Sunday Creek.....	800,000
	<hr/> \$5,000,000

Cincinnati now imports 36,000,000 of bushels of coal per annum. The additional population which (as above) we have estimated on the north for the next ten years, will require 20,000,000, to say nothing of the competition of the railroad coal in the heart of the city. Say this coal from Sunday Creek—the best in the country and therefore to be preferred—is brought at five cents per bushel from Sunday Creek to the main depot. Then the coal traffic will stand thus with the railroads:

20,000,000 bushels of coal at 5 cts.	\$1,000,000
Cost of transportation 50 per cent.	500,000

Net profits of the road..... 500,000

Ten per cent. of \$5,000,000, is \$500,000.

Thus we see that without any other business whatever, the road would make 10 per cent. But each of these roads would have its own particular business, as the Wilmington road now has. If these roads then co-operate, the tunnel road will receive \$120,000 per annum on this coal traffic, without supposing that it has any special interest in it. This is the way the railroad account will stand. Now let us look into the actual working of the coal business with regard to the supply of the people and the economy of such carriage.

Coal in Cincinnati costs the consumer in his home about 14 cents per bushel, occasionally cheaper, oftener more. This is made up of four elements, the cost of labor at the mines, the freights at the river, the profits of the importer and the cartage. Of these, the cartage to those in the lower part of the city is about 2 cents, and to those on the upper plain about 3 cents. If it had to be carted from any point on the river to that population which we have supposed to be on or over the hills, it could hardly be done for 5 or 6 cents per bushel. That, the reader perceives, is no more than the railroad freight. Now we propose, if the the tunnel is made, to furnish coal

permanently and uniformly to the consumer by railroad for 11 cents per bushel, and this with ample profits to the railroad and the miner. It will be done thus:

Miner and proprietor.....	4 cents.
Railroad carriage.....	5 "
Cartage (average).....	2 "

Now, the only point about this of which the reader can have any doubt is the transportation, the railroad part of it; and if the railroads are no better prepared and take no more interest than they do now, we may well doubt whether they could transport coal cheaply, and that has evidently been the opinion of most people in Cincinnati; and so they have made no effort to get up competition with the river. But this opinion is a total and plain mistake. Look at the *Baltimore & Ohio Railroad* carrying millions of tons of coal to Baltimore, right beside a canal! The reason is that the railroad has adopted the proper means and prepared itself for the work; and here we may say that the facilities for carrying coal from Sunday Creek to the tunnel, (supposing the two points to be connected) are greater than in Baltimore. Let there be the iron cup dumping cars expressly for coal, and at the Great Vein (Sunday Creek) the coal can be shoveled right in, and on the tunnel road it can be dumped off at any depot selected. The cost will be almost nothing but the carriage; and the whole northern population of Cincinnati will have coal by rail cheaper than they can possibly have it by river.

The Cincinnati & Mackinaw Railroad.

IMPORTANT PRELIMINARY MOVEMENTS.

Last week, by previous arrangement, the President and three of the directors of the Cincinnati, Hamilton & Dayton Railroad met at Greenville, in Darke county, Ohio, to confer with the people along the line of the Cincinnati & Mackinaw Railroad upon ways and means by which this grand old work can be completed.

The attendance of the citizens and persons interested in the work was unusually large, and the greatest good-will and harmony prevailed in the deliberations.

The plan under consideration contemplates the construction of a new road from Eaton in Preble county, to Greenville, thence upon the old Mackinaw line to Van Wert, a point upon the Pittsburg, Ft. Wayne & Chicago Railroad, and hereafter to Hillsdale, Lansing, Saginaw and the Straits in Michigan.

After considerable interesting discussion upon the merits of the line, its condition and the best plan to work it up, the C. H. & D. folks retired to prepare a proposition to the people which resulted in the following as the basis of a contract between the parties in interest:

BASIS OF CONTRACT PROPOSED BY THE C., H. AND D. R. R. CO.

The following we hereby submit as a basis of a proposition to the parties interested in the completion of a line of railroad from Eaton, in Preble county, to Van Wert, in Van Wert county, Ohio:

1. If the parties in behalf of the road will grade, culvert, bridge and tie that section of this line between Eaton and Greenville, and in addition thereto, provide ample grounds for station houses, side-tracks, &c., for a first class railroad track, and provide the sum of \$1,000 per mile towards the cost of ballasting, &c., to be paid when this section is in full operation, and will convey said road bed so prepared, free from debt, and without stock or any other liens whatever, to the C., H. and D. R. R. Co., said C., H. and D. Co. will at once iron said section of road, and equip and operate it as a first class railroad.

2. If a second section of said line, from Greenville to Celina, in Mercer county, Ohio, is placed in the same situation, we will accept and complete that section in like manner.

3. And if a third section, being that part from Celina to Van Wert, is so completed as the other sections, we will likewise complete and operate that part of the line in the same manner as the other sections of said line.

This proposition being submitted to the meeting, a committee of those from each county along the line of the road as far north as Van Wert was appointed to examine it and report back any alterations or amendments thereto. After due deliberation this committee reported the following counter proposition:

The corporation to be organized from Eaton to Van Wert, as an entirety, will secure the right of way for main and side-tracks and grounds necessary for station-houses, and grade, culvert and bridge the line of road between said points, and furnish ties on said line, all of a quality suitable for a first class railroad, as constructed in Ohio and Indiana; and as soon as thus constructed and prepared (which is to be within two years,) the line to be delivered to the C., H. & D. R. R. free from debts or incumbrances of any kind; and the said C., H. & D. R. R. on its part to accept the same as thus prepared, and proceed at once to put on the iron and rolling stock as required for a first class railroad in Ohio and Indiana, and shall run cars over said entire line within one year from the time it is so prepared and delivered to it, as above provided for. And within the same time to erect suitable station houses at proper and necessary points for the accommodation of the business of the country through which it passes.

It was evident from these expressions of the parties that an agreement between them could probably be reached, and it therefore became necessary that each party should become qualified to conclude and enter into a contract to carry it out.

This could only be done upon the part of the C., H. & D. interest by consulting with the remainder of the directors and the stockholders of the company, and upon the part of the citizens by conference with all the parties interested upon the line of the road.

For these purposes the meeting adjourned, to meet again at some future time and place as early as possible to report progress.

Our readers will recognize in this the revival of an old scheme and a good one. What it will amount to remains to be seen. As a preliminary movement this is all well enough, but can the details be worked out, that is the question. For ourselves we have no doubt of it, if the right parties are set to work and supported in their efforts. This plan will certainly give the people the long wished for road, and although they make great sacrifices to obtain it, they will be amply compensated by its indirect but certain benefits.

What has been done during the past week since the adjournment we are not advised, but as there is no time to be lost, and both parties seemed to be anxious, we suppose they are at work, and we hope they find the prospects encouraging.

Dayton & Union Railroad.

During the past week we made two trips over this road, from Dayton to Greenville and return, and are pleased to say that we found it in good order, well managed, possessing first-class equipment, and making excellent time.

For some years this road has been under the superintendency of Mr. S. R. Stimpson, who has certainly made the most of it, and who deserves great credit for doing so, as the line is a short one, and its direction being out of the course of great east and west thoroughfares, it was cut off from important connections and reduced to (almost strictly) a local business. This state of things Mr. Stimpson comprehended at any early day, and at once set to work to produce the largest results out of this trade. He studied the local interests of his road; stimulated, as far as he could, the development of the country through which it passed; rendered his management popular by serving the wants of the people, and by inaugurating a strict yet discreet economy.

He is now reaping the reward of his efforts in a good and growing traffic, adequate to render his road profitable, and that no competitor can take away, or even interfere with.

This road ought to be merged into some long line reaching up into that northern section of country, so full of industrial resources and yet without railroad communication with the rest of the world, and at the same time connecting with some road leading to this city. This, we believe, will be its fate. The northern section we speak of is opening up, and can not long be deprived of railroad facilities, and new schemes are far advanced that will give the requisite connections with this city. When these are on the way, or are completed, Mr. Stimpson's usefulness will be extended, and his experience and discipline in railroad management find the scope it deserves.

Cincinnati, Hamilton & Dayton Railroad.

The stockholders of the C., H. & D. R. R. met in annual session on the 9th inst., in the company's buildings in this city.

The meeting was organized by calling John G. Lowe, Esq., to the chair, and electing F. H. Short, secretary.

The first business in order was the report of the committee appointed at the last annual meeting of the stockholders to examine into the affairs of the stock yards of the company.

Hon. Henry Stanbery, being chairman of the committee, presented a full report thereon, and recommended the adoption of a resolution relating thereto, which was adopted.

The report of the committee appointed to traverse and examine the road, reported by W. H. Davis, their chairman, that they found the road in good condition, and the manufactories and shops properly conducted and under the direction of efficient and competent managers.

They recommended the building at Cincinnati of a large and capacious coal elevator, to meet the growing demands for this kind of fuel for the company's locomotives and machine shops, as well as part of the ordinary domestic consumption.

The committee report a large increase in the grain business at Toledo; to meet this want, they urge the building of a new and enlarged grain elevator at that point.

They also report skill and efficiency on the part of all the officers and employees of the road.

Daniel McLaren, the president of the company, submitted his annual report, from which we abstract the following interesting items:

Gross earnings of the company.....	\$1,270,621 93
Transportation expenses.....	627,295 93

Leaving for interest on bonds, taxes and dividends.....	\$643,326 05
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The operating expenses have been 49 36-100 per cent of the gross earnings.

Earnings per mile.....	\$21,177 03
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Number of passengers carried.....	753,787
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Tons of freight moved in narrow-gauge cars.....	486,030
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The net earnings have been 12 68-100 per cent, out of which two cash dividends have been paid to the stockholders, of 4 per cent. each, free from Government tax.

Since the last annual report the project of constructing another road between Dayton and Cincinnati, through the Miami and Mill-creek valleys, appears to have taken a definite shape, under the name of the Springfield and Cincinnati Railway Company. It is understood to have made arrangements for a lease of that portion of the Cincinnati, Sandusky & Cleveland road lying between Springfield and Dayton, and have surveyed and projected a line from the latter point to Cincinnati by the way of Franklin, Middletown, Sharon, Lockland, &c. This enterprise is intended to furnish a line for the use of the New York Central, Lake Shore, Cleveland, Columbus & Cincinnati, and Cincinnati, Sandusky & Cleveland Railway Companies, to Cincinnati and

the South west. While it is not supposed, on our part, to be called into existence by any public necessity, and from its proximity to our road will become a competitor for a portion of our business, we should have been glad, on our own account, not to have to encounter its rivalry, and willing to have made reasonable sacrifices to obviate the same; still we are nevertheless bound to contemplate that it will be put into actual operation, with whatever consequences the necessities of the case entail. We feel confident, however, that by diligent cultivation of our advantages, strict economy and prudent management, the property of this company and its net increase will continue to satisfy the just and reasonable expectations of the stockholders.

The secretary of the company, Mr. F. H. Short, read a report detailing the finances of the company, which was highly approved.

The election of directors for the ensuing year resulted in the choice of Daniel McLaren, S. S. L'Hommedieu, Wm. Goodman, Geo. T. Stedman, Samuel Fosdick, H. D. Huntington, Lowell Fletcher, Chas. W. West.

We shall make the particulars of the president's report the texts for future articles for the RECORD.

The Battle of the Horns in Columbus.

In the late contest in Columbus between the "long and short horns," the most conspicuous, indomitable and successful worker, was Hon. C. L. Vallandigham. He went into that fight, as he goes into everything of the sort, with all his might and soul. For five weeks, every day, and all day (and we are nearly safe in saying every night), he was at work everywhere that he could do the least good for his cause, whether by making friends for the "long horns," which he favored, or thwarting the schemes of the "short horns," which he opposed. He was the first to plan for the one, and first to discern the plans of the other. His pluck, zeal and determination kept all his followers up to their highest working point, and his skill and judgment directed them in the channel that held the majority fast as in a vise, for weeks, and then utterly routed them.

We watched this maneuvering with a great deal of interest, and saw, we think, wherein lies Mr. Vallandigham's power in politics. He controls men, not so much by his talents and learning, as by his strong will, tireless energy, and courage in encountering obstacles.

These qualities he never exercised in a more eminent degree than in the struggle of which we speak at Columbus. Strong men represented the other side, and were not remiss in a single duty; but no such man led them as this gentleman. If there had been, we could hardly have predicted the result; but had he been upon the other side, we think there can be but little doubt that the "short horns" would to-day wear the laurels of success.

The manufacture of paper was commenced in Philadelphia in 1732.

The Cincinnati & Mackinaw Railroad.

By virtue of an order from the Court of Common Pleas of Darke county, Ohio, this road was sold at Greenville, on Saturday last, for \$11,333, to John S. Winner, Thos. Turpen, S. R. Stimpson, Mr. Moore and Chas. Matchett—\$500 being paid down, and the remainder to be paid on or before the 20th day of June next.

These gentlemen purchased the road on behalf of the interests of Greenville, and the country northward along the line, and for the purpose of carrying out as far as practicable the arrangements made concerning it, of which we speak in another column of this paper.

We understand that if this arrangement can not be carried out satisfactorily, these purchasers will transfer the road to any company that will secure its completion at the earliest possible period, and at the price they are to pay for it.

This is a splendid opportunity for some good company to secure a long line of graded road for a mere trifle of its real value.

RAILROAD CHANGE—FT. WAYNE, MUNCIE & CINCINNATI R. R.—The general offices of the company will hereafter be at Fort Wayne. Mr. Jno. J. Grafton has been appointed General Ticket Agent. Officers and agents of other companies having business transactions with this road, will please address communications accordingly.

Meeting of Corporators of the Ironton, Portsmouth and Cincinnati Railroad Company.

A meeting of the corporators of the above named company was held at the Crawford House, in the city of Cincinnati, on the 8th of May, 1871. Colonel Kinney, President of the Board of Corporators, took the chair and called the meeting to order, and thereupon, on motion of E. P. Evans, Esq., C. A. White was appointed Secretary. Benjamin Kline, Chairman of the Committee, heretofore appointed to employ an engineer and procure a survey, plat and profile of the route for said road, and to raise means to defray the expense thereof, made report and presented a full and complete plat and profile of the road.

On motion, it was ordered that the committee heretofore appointed on survey be continued, with power to take and collect subscriptions to pay the expense of making the survey and report, and to make such alterations and corrections in the route as surveyed as they may think proper; that all funds collected by them be forwarded to the Treasurer of the Board and be paid out by him upon the order of the Chairman of the Committee, approved by the President of the Board.

On motion, it was further ordered that books for the subscription of stock be opened, and for that purpose a committee of three from each county through which the road runs be appointed to open books for the subscription of stock and to solicit subscriptions; thereupon the President appointed said committee as follows:

John Shillito, John Carlisle and Benj' Kline for Hamilton county; J. R. Foster' Paul Meehr and John Goodwin for Clermont county; John P. Biehn, J. R. Gray and Dr. Wm. Elsberry, for Brown county; Rev. Joseph Smith, E. P. Evans and J. N. McClung, for Adams county; Philip W. Noel, S. E. Warner and Emanuel Miller, for Scioto county; Hiram Campbell, S. B. Hempstead and Judge Johnson, for Lawrence county.

On motion, it was further ordered that said several committees, in the several counties, be authorized to fill all vacancies that may occur; that they have power to add to their numbers as they may see proper; that said committees report from time to time the amount of stock subscribed in the several counties to the President of the Board, and that as soon as a sufficient amount of stock is subscribed to authorize the election of officers for said company, that the President call a meeting of the stockholders for the election of officers and the organization of said company, and that to that end he give notice of the time, place and object of the meeting, as required by law.

On motion, it was ordered that the proceedings of this meeting be published in the several papers printed in the city of Cincinnati, and the several counties through which the road runs.

On motion, the meeting adjourned.
P. KINNEY, President
C. A. WHITE, Secretary.

Northern Pacific—Engineering Features.

In another place we have adverted to the progress and prospects of this road. To give a better idea of the extent and reach of its route and required outlays, we present the following statistics:

The road is divided into six great sections. 1. From Lake Superior to Yellowstone river, 550 miles. 2. Along the Yellowstone to Bozeman's pass, 420 miles. 3. Bozeman's pass to Hellgate river, Mountain division, 225 miles. 4. Hellgate river to Pend d'Oreille lake, 205 miles. 5. Pend d'Oreille lake to the mouth of the Lewes river. 6. Mouth of Lewes river to Puget sound, Columbia valley division, 377 miles. The estimated cost of building and equipping this road will be \$85,277,000, or an average of \$42,638 per mile. The following table shows a summary of the items of the probable cost of construction and equipment:

Grading, masonry, bridging, track and ballast.....	\$60,320,000
Sidings, &c.....	4,200,000
Contingencies, including superintendence and engineering.....	5,000,000
Telegraph line.....	800,000
Buildings.....	2,312,000
Rolling stock.....	3,615,000
Branch road.....	1,200,000
Extra work, &c.....	800,000
Total.....	\$78,047,000
Interest on bonds over receipts during construction.....	7,230,000
Total.....	\$85,277,000

The expense of construction will not be excessive, remembering that the grade is much lower, that there will be no tunneling, not as much trouble from snow as on the New York roads, and abundance of the very best wood and productive coalfields all along the route.
—Chicago Review.

The Detroit Tunnel.

We are informed that this great work is to be constructed as soon as possible, and that work will be commenced immediately.

It may not be amiss to refer here to some of the leading features of this work. It will enter the ground on the Detroit side, near the present station of the Michigan Central, and extend north-eastward about 2,000 feet nearly parallel with the river. Thence it turns by a curve of about 60 degrees to and under the river, the curved portion being about 2,500 feet long. Thence the course is straight for about 2,200 feet and nearly to the Canada shore, whence a curve of about 50 degrees and about 1,800 feet long brings it to the open cutting on the Canada side in a direction parallel to the river. The entire length of the tunnel underground is to be 8,568 feet, or about 1 3/5 miles. There are to be, in fact, two tunnels, parallel to each other, one for each track, it being esteemed cheaper to make two than one large enough for two tracks. The estimated cost of the work, including right of way and track laid with steel rails, is \$2,650,000. The engineer believes that it can be completed within two years.

It becomes every year more and more necessary for the Michigan Central and Great Western to improve their means of transit at Detroit river. The stream is not too wide to be bridged—about half a mile—but a bridge high enough to clear the masts of the vessels sailing on the lakes would be very costly, and the commerce is so great that a draw-bridge would need to be open almost constantly during the season of navigation. A charter has been obtained for the tunnel, and authority to construct it from both the United States and the Dominion of Canada.

From a statement compiled from the Treasury returns, showing the whole importation of each class of manufactures into the United States from 1858 to 1870, inclusive, it appears that while the whole importation was \$23,000,000 less in 1870 than in 1869, yet the receipts of carpets were \$1,400,000 greater; of manufactures of flax, \$5,500,000 higher; of hemp goods, \$1,000,000 higher; and of clothing, \$5,600,000 higher; while there was a decrease, on this comparison, of \$5,000,000 in wool and worsted goods; of \$14,600,000 in cotton goods, and of \$9,100,000 in manufactures of silk. It is proper to remark, however, that in 1860 the receipts of cotton goods were about \$7,500,000 above the average. The statement shows a very wide variation in the consumption per head of population. In 1862, when we suffered from the first effects of the war, the importation was \$2.40 per capita; and in 1866, the first year after the war, it rose to \$5.80, the highest average. It appears that, out of a total of \$1,619,000,000 of dry goods imported into the United States within the last thirteen years, \$1,104,000,000 were received at the port of New York, showing that, on the average, the importations at New York are over two-thirds those of the whole United States.

IRON.—In the United States there were manufactured, in 1840, 347,000 tons of iron; in the same year, in Great Britain, 1,500,000 tons. In 1869 in the United States 1,916,000, and in Britain 5,200,000 tons. During the former year about 2 1/2 times more in Britain; in the latter, 2 3/4 times. We have not kept pace with our demands or resources. Britain has increased her iron manufacture more rapidly than her population or the demands of her citizens.

Pneumatic Transit under Cities.

Our readers are aware that London has one underground steam railway system, which is operated with great regularity and increasing success. Its total length is now 13 1/2 miles. It was built in two sections, and opened as fast as completed—the first in 1863; and the last—Westminster bridge to Blackfriars—1 1/2 miles, in May, 1870. The last report of the company shows that during the first half of 1870, over 19,000,000 of passengers were carried, an average of nearly 112,000 per day.

Judging from the statement of Mr. Beach in his letter, and from those that have privately reached us through other channels, the problem of speedy, economical, safe and pleasant underground transit may be regarded as decisively solved on a system superior to that in successful operation in London.

The railway commences at the foundation lines of the splendid marble building corner Warren street, and extends in a curve down Broadway. The lower terminus is to be at the South ferry; but the present operating section only extends a little below the City hall, about 300 feet.

The bed is 21 feet below the surface; the diameter of the tunnel is 9 feet; the passenger car is about the size of the ordinary street cars, tastefully fitted up, brilliantly lighted, and with seats for 22.

The visitor descends a few steps to the elegant waiting-room, at one end of which is the mouth of the tunnel. On taking seats in the car, the conductor closes one of the doors, and touches a telegraph signal, when the car immediately moves rapidly down Broadway. The changes of motion, effected with exceeding gentleness, are almost imperceptible. The car glides smoothly along with little noise; the atmosphere pure and fresh, is without cinders, dust, gas or smoke.

The average rate in this short section is seven miles per hour; the average pressure in operating the car is only one-third of one ounce per square inch; but at starting that pressure rises nearly to one ounce to the inch.

The wheels, at certain points on the route, press a telegraph key, sending a signal to the engineer, who turns a valve and reverses the air current, without stoppage of the machinery.

The motor or blowing machine by which the current is produced, consists of a pair of great wings, geared together, and turned by steam, and capable of discharging 100,000 cubic feet per minute, enough to fill three three-story city dwelling-houses.

During the construction of the tunnel the entire travel of Broadway passed on as usual, over the heads of the workmen, safely protected within an immense boring machine, pushed forward by powerful hydraulic rams; and as fast as it advances the masonry is built up within its rear.

The general plan is to lay a double line of tubes from the South ferry, under Broadway, the entire length of the island; with a branch at Union square, under Fourth avenue to Harlem river. Such a road would carry forty thousand passengers per hour, at a speed of thirty miles per hour.

The stations will be a quarter of a mile apart; also there will be express cars, making but few stops. The running time will be:

South ferry to City hall,	2 minutes.
City hall to Fourteenth street,	4 minutes.
" Twenty-third "	5 "
" Forty-second "	7 "
" Central park (59th) "	5 "
" Seventy-ninth st., "	11 "
" 110th street, "	13 1/2 "
" Harlem river, "	16 "
" Manhattanville, "	16 "

The estimated cost is one million dollars per

mile below Twenty-third street, and two millions per mile above Twenty-third street.

The principal difficulties in respect to grades and curves that would be met in any city line have been purposely introduced in the present Broadway section, which has a grade of 1 in 20, and curve with radius of 50 feet.

The company claim to have demonstrated the following points:

1st. That they can build under streets, without invading private property, interfering with vault privileges, or serious disturbance of pipes and sewers or of the surface.

2d. That they can effectively operate their railways, without shaking adjoining buildings, subjecting passengers to gas, cinders or dust, and detentions from storms.

3d. That they can operate railways, secure from accident, rapid for transit, and safe for passengers.—*Chicago Review.*

Tin and the Sources of its Supply.

Straits tin comes from the mountainous regions of Lower Siam, where the ore is mined by the natives and brought down by them in baskets to Junkseytown, on the west coast. It is here bought and smelted by individuals or companies, and comes to the market by different brands—principally, however, with name of "Bousted" on the bottom of the slah.

Malacca tin comes from Singapore; the ores are, however, mined principally in the mountainous regions of Malacca and in the same range of mountains as those of Lower Siam, but the tin commands a preference over the ordinary Straits tin by reason of the richer and more uniform character of the ores from which it is smelted and the more skillful manner in which the work is done.

Banca tin comes from the island of Banca, which is located but a short distance off the eastern coast of Sumatra. This is the finest and best tin known, and brings from 2 to 3 cents per lb. in gold more than either Straits or Malacca. The island of Banca belongs to the Dutch, and the tin is under the control of the Dutch Trading Company, who bring the tin to Amsterdam and make sales annually—giving due notice to purchasers. The sales are made by auction, and usually comprise the product of the previous year. The stock of a current year is never sold till the whole product of the year has been ascertained.

Billitan tin comes from the island of that name, which is just a little distance south-east of Banca. This is a tin which, although regarded as superior to Straits and Malacca, is not very extensively used in this country, and sells at about the same price.

English tin is mined in Cornwall, the southwestern portion of the mainland. These mines have been worked from the earliest known records of ancient Britain. The mines have now been worked down to such a low depth that the cost of mining and raising the ore, and pumping out the water is so great, that unless the price of tin is very high—say from £130 to £140 sterling per ton—the result is financially disastrous. The English tin is found in what would be called lean ores—not rich or of a high grade or percentage, and frequently associated with copper—copper and tin alternating in the same veins or lodes—consequently requires greater manipulation or refining, and the result is a tin not so good or pure, for purposes of alloy with other metals in the arts, as either of the above described brands of tin from the East Indies.

It is a remarkable fact that in the economy of nature tin has never been found in workable quantities excepting in the above described localities.

An immense woolen manufactory is to be started soon at Fort Scott, Kansas.

Copper.

The metal known as copper derives its name from the Latin word *cuprum*, which also designated that part of the island of Cyprus in which this metal was first mined by the ancient Greeks.

Copper was one of the first metals known to man, and was employed for a variety of useful and ornamental purposes. From it were made images, instruments of war, mechanical tools, and many household utensils. Bronze is a union of copper and tin, and claims priority over all other alloys. It is alluded to in the fourth chapter of Genesis, where Tubal Cain is described as "an instructor of every artificer in brass and iron." The word brass in this connection signifies bronze, for this date was anterior to the discovery of the composition of copper and zinc. The Syrians and Phœnicians, and likewise the Greeks and Romans, used copper very largely in the erection of monuments and statues. Sometimes these structures were of pure metal, but most commonly they were made of bronze.

Copper is very malleable, and also very ductile. So great is its tenacity that a copper wire is capable of supporting a very great weight without breaking. Copper is extensively used for the sheathing of ships, for making boilers, kettles and cooking utensils. In India, on the occasion of the death of a Hindoo of rank, custom provides that every Brahmin present at his funeral be presented with a brass cup, and the number thus disposed of is sometimes very large.

The liability of copper to oxidation from exposure to air or damp is its principal defect, but this is in a measure overcome when alloyed with tin. The compound is less liable to rust and gather verdigris. It is also harder, denser, and more sonorous. If the tin equals one-sixth of the mass it is very brittle, and the proportion must be lessened until the proper medium is attained.

Bell-metal is made of an alloy of copper, tin and zinc, and is extremely well fitted to the purposes for which it is used. For cannon, a lower proportion of tin is commonly used. Some kinds of bell-metal contain, besides the usual alloy, small quantities of antimony and silver.

An alloy of copper and tin, when the latter metal does not exceed one-third of the mass, results in a very beautiful compound, of the color of steel, very hard, and susceptible of a brilliant polish. It is used to some extent in the construction of mirrors. This application of the metal is one of great antiquity, and is mentioned by Pliny, the historian. These mirrors are admirably adapted to the reflection of light for optical purposes; and this combination is therefore called speculum metal.

Copper is abundant in Great Britain, Saxony, Sweden, Russia, China, Chili, Prussia, Japan and the United States. The most productive mines in England are those in Cornwall. In this country Lake Superior is the great copper mining region of the Continent. The copper mines of Sweden are supposed to have been worked over one thousand years. In the 17th century the Dalecarlia mine yielded an annual product of 8,000,000 pounds of pure metal; but it has since greatly fallen off, and the quantity now obtained is limited. The copper mines of Chili are also very rich, but the best ore is obtained in Japan, which contains the richest mines of this metal in the world. It is much purer, and brings a higher price than any other variety of bar or slab copper.—*N. Y. Merc. Journal*.

The whole extent of the public domain of the United States is now about 1,000,000,000 acres!

Tea Culture in the United States.

Experiments made of late years, upon a limited scale, in South Carolina, California and Tennessee, have demonstrated that the climate of many parts of the United States is well adapted to the cultivation of the Chinese tea plant. In China it is grown between the twentieth and fortieth degrees of north latitude. It does not require a warm climate, is very hardy, and is said to thrive better where subject to freezing in winter, than where it is not so exposed. The soil, it appears should be light and well drained; and the plant, while it grows in some sections of China on the hill sides, in a wild state, flourishes best with careful culture on the plains, where the soil is well drained and not too rich. One crop of leaves usually is gathered in the spring and another in the fall, the spring gathering being considered the best. The plants are set in hills, very much as we plant corn, three to four feet apart; the growth is about three feet in height, and an ordinary plant is productive for about ten years, at the expiration of which time it requires to be renewed. It requires three years' growth before the plant attains sufficient size to produce a crop worth gathering.

The chief difference between black and green tea is caused by the mode of curing and the age of the leaves. The leaves of green tea are dried quickly, without being exposed after gathering, while the leaves of black tea are allowed to lie out exposed to the action of the dew.

The proper time for planting, is in November and December; the plants are hardy and prolific. The picking season begins about the 1st of April and continues until October, during which time there is a continuous series of "flushes," or pickings, from fifteen to twenty days apart. The yield of a well cultivated plantation is about one pound of prepared tea to the plant, or four pounds of leaves in their green state. An acre of land will sustain about twelve hundred plants, and consequently yield that number of pounds of tea when in full bearing. The Chinese method of preparing and manufacturing tea is very primitive, and is no doubt capable of important improvements by the aid of machinery, especially in the rolling process. As to the market for this product, the quantity of tea consumed in the world is enormous. Great Britain alone consumes about sixty millions of pounds, and the United States about forty millions.

Dr. Smith, of Greenville, South Carolina, has cultivated tea in the mountainous districts of that State, exposed to the frosts and ice of winter without injury. It is his opinion that there is no climatic obstacle to its successful cultivation in the United States. If the experiments in tea culture now making in California and South Carolina prove successful and remunerative, there will hardly be a limit to the extent which the culture may assume on the Pacific coast, as well as in the hilly regions of some of our Southern States.—*Economist*.

Fur and leather clothing is used by about half of the inhabitable globe, for these materials prevail in Siberia, Northern Europe, two-thirds of North America and the southern extremity of South America.

Postage stamps of the denomination of seven cents have been issued by the government. They are designed especially to prepay letters to Germany, seven cents being the rate to that country.

There are 3,000 acres of oyster beds in Chesapeake bay, yielding annually 25,000,000 bushels of oysters. In Baltimore, upward of \$10,000,000 are employed in the business of canning oysters.

The Uses of Iron.

Iron cuts away the rawness of utter barbarism in the shape of the ax which clears the forest. It exhibits itself as the foremost vassal of civilization in the plow which turns the soil, and the scythe which cuts the crop. It proceeds to give the town its huge water pipes, the individual the delicate hair spring of his watch. It then furnishes the nails, chains and anchors, as well as composes the cannon of our gunboats. But unquestionably the full value of iron is not grasped till we come to the magic word—railways. We can not, perhaps, more forcibly illustrate this fact than by inviting the reader's attention to the position of iron-retaining Belgium. Its relation to iron bankrupt nations is most enviable, most fortunate. In the first six months of this year it exported 1,657 tons of rails to Spain. Belgium happens to have iron now Spain only used to have it. Belgium can sell her iron across the counter in iron-worshipping 1870. Spain, as an iron disseminating country, flourished magnificently only to collapse before the dawn of this iron at-any-price age of steam. From 1711 to 1718 the quantity of iron sent from Spain to Great Britain averaged 1,560 tons. From 1729 to 1735 the average was 1,770 tons. After about 1750 the exportation grew less, till in 1795 it ceased altogether; and now iron is imported from Belgium by Spain. Again, Belgium, during the first half of the present twelve months, provided Russia with 10,566 tons of rails. History, on the other hand, tells us how in Russia there has always been, till it would have been most useful, a wealth of iron ore, though in early times we find a penury of information about them. In 1569 a treaty was drawn up, which allowed the English the privilege of smelting iron ore in return for teaching the Russians how to work the metal, and on condition of their paying a half penny for every pound they exported. Previous to his journey in foreign lauds, Peter the Great threw his whole soul into iron. He himself toiled in iron works. He then apprenticed himself to the trade in Saxony. He obtained, as the nucleus of artistic skill, a dozen workmen from the king of Poland. In obedience to his commands, in 1719 Colonel Herring traveled methodically throughout Europe, with a view of draining dry all the sources of information about iron. His return was the signal for setting up wire manufactories, forges for steel, and all the thousand and one appliances of iron. Thus Spain and Russia have had their cakes. They can not eat their cakes and retain their iron too. Belgium "comes up smiling" and supplies them both at famine price.—*English Ex.*

PROTECTION OF STONE BY SALTS OF COPPER.—

Dr. Roberts, of Paris, recommends earnestly the use of salts of copper, as the best preservative against the weathering of stone in a moist climate; and endeavors to prove that the wasting away of sandstone and granite is due to various causes, one of the most important of which is the development of a minute lichen (the *Lepra antiquitatis*). This plant is so destructive that the beautiful marble sculptures in the park, at Versailles, would be completely destroyed by it, in the space of fifty years, unless precautions were taken to arrest its ravages. Dr. Roberts states that the amount of weathering away of rocks of all kinds, granite not excepted, is much greater than the public generally are aware of, especially when subjected to the influence of a moist atmosphere. Thus, the obelisk of Luxor, which was brought to Paris, from Egypt, forty years ago, has become completely bleached out, and full of small cracks, while for the previous forty centuries during which it stood in Egypt no change had been produced.

Increase of Large Cities.

The population of New York city in 1850 was 515,537; in 1860, 813,669, an increase of nearly 58 per cent.; and in 1870, 923,341, an increase since 1860 of nearly 14 per cent.

Philadelphia had 508,572 in 1850, and 565,529 in 1860, an increase of over 38 per cent.; and 657,159 in 1870, an increase since 1860 of over 16 per cent. The increase of Philadelphia has been over 2 per cent. greater during the past ten years than that of New York.

Brooklyn increased from 96,833 in 1850 to 266,651 in 1860, and 396,661 in 1870, an increase of over 175, and nearly 49 per cent. respectively.

Chicago increased from 29,963 in 1850 to 109,260 in 1860, and 348,709 in 1870, an increase of nearly 265, and 219 per cent. respectively.

St. Louis increased from 77,866 in 1850 to 160,773 in 1860, and 313,013 in 1870, an increase of over 106 and nearly 95 per cent. respectively.

Baltimore increased from 169,054 in 1850 to 212,413 in 1860, and 276,299 in 1870, an increase of nearly 25 and over 30 per cent. respectively.

Boston increased from 136,881 in 1850 to 177,840 in 1860, and 250,701 in 1870, an increase of nearly 30 and 41 per cent. respectively.

Cincinnati increased from 115,435 in 1850 to 161,044 in 1860, and 218,900 in 1870, an increase of nearly 40 and 36 per cent. respectively.

Sau Francisco increased from 34,776 in 1850 to 56,802 in 1860, and 150,361 in 1870, an increase of over 63 and nearly 165 per cent.

Washington increased from 40,001 in 1850 to 61,133 in 1860, and 189,238 in 1870, an increase of nearly 63 and 79 per cent.

Pittsburg increased from 46,601 in 1850 to 49,217 in 1860, and 87,215 in 1870, an increase of nearly 6 and 77 per cent. respectively.

The area of the organized territories of the United States, including Alaska, is greater than all the States that have been organized as parts of the Union. There are about a thousand million acres of land in these territories, as follows:

Washington	44,796,160
New Mexico	77,568,640
Utah	54,065,043
Dacotah	96,596,128
Colorado	66,880,000
Montana	92,016,640
Arizona	72,906,240
Idaho	55,288,160
Wyoming	62,645,068
Indian	44,154,240
Alaska	369,529,600

A grand total of.....1,036,445,919

In this vast domain there are not over half a million of white inhabitants. It is richer than the acres included in the organized States. We need a population of one hundred millions, and with these we would hardly have enough for neighborhood purposes, and that concentration in cities which such a country requires for commercial convenience, and for the encouragement of the arts and sciences.

During the year 1870 491 ships passed through the Suez canal, of which 319 were British, 75 French, 26 Austrian, 3 Spanish, 15 Turkish, 32 Egyptian, 9 Italian, 2 Ottoman, 2 Dutch, 2 Portuguese, and 1 each Russian, Danish, Greek, Zanzibar and American. No ship passed through the canal under the North German flag.

SUGAR vs. COTTON.—The Early County (Ga.)

News presents the following interesting statement of the comparative profits of sugar and cotton culture: A correspondent writes the results of an experiment in the cultivation of cotton and sugar cane, giving the cost and relative profits of each crop. He planted six and a half acres in cotton and estimates the cost of working picking hauling and ginning, at \$17—the yield being 666 pounds of clean cotton; which, at 15 cents a pound, amounts to \$99.90, showing a profit of \$52.90. Of cane he planted one and a half acres, and estimates the cost of seed, manure, planting, working, cutting, hauling, grinding and boiling, at \$90—the yield being 12 barrels of sugar, averaging 200 pounds each, 5 barrels of sirup, 136 gallons, and 4 barrels of molasses, 130 gallons; which at 18 cents a pound for the sugar, and 75 cents a gallon for the sirup and molasses, amounts to \$631, showing a profit of \$541.50. These figures appear rather incredible, but the correspondent certifies that they are correct. Here we have an acre and a half of cane, yielding a net profit of \$488.60 more than six and a half acres of cotton! The correspondent, we think, estimates his sugar and sirup too high; but putting them at the minimum price, we still have a large amount over the profit of the cotton.

The failures in the United States during 1870, it is reported, amounted to 3,551, involving liabilities of \$88,242,000, against failures during 1869 amounting to 2,799, involving liabilities of \$75,054,000. The failures in New York city and Brooklyn during 1870 amounted to 430 involving liabilities of 21,370,000. The failures in Pennsylvania during 1870 amounted to 418, involving liabilities of \$10,682,000, against failures during 1869 amounting to 306, involving liabilities of \$7,844,000. The amount of liabilities assigned to the failures in the principal States in the United States during 1870 amounted as follows: Ohio, failures 266, liabilities \$7,956,000; Massachusetts, failures 267, liabilities \$7,598,000; Illinois, failures 214, liabilities \$3,910,000; New York (excepting the cities of New York and Brooklyn), failures 388, liabilities \$5,692,000; Michigan, failures 168, liabilities \$3,227,000; California, failures 60, liabilities \$2,423,000. The inferences derived from the full table of statistics are not considered as satisfactory, inasmuch as an increase of twenty-five per cent. in failures, as compared with 1869, and thirty-three per cent. as compared with 1868, it is asserted, indicates a discouraging want of success.

ZINCING IRON.—A new way has been proposed by Roque for coating iron with zinc without the aid of heat. The metal is thoroughly cleaned by immersing it in a bath composed of 1,000 liters of water 250 liters of hydro-chloric acid, 50 liters of sulphuric acid, 20 liters of glycerine, and afterwards rinsing it in another bath of water containing 10 per cent. of potash. It is then ready for the zincing bath, which must be prepared as follows: Water, 1,000 liters; tin salt, 5 kilos; chloride of zinc, 4 kilos; bicarbonate of potash, 8 kilos; sulphate of alumina, 4 kilos; chloride of aluminium, 10 kilos. The iron is immersed in this mixture from 3 to 12 hours, according to the thickness of the coating it is desired to have. The process is admirably adapted to the galvanizing of iron castings, hollow ware, statuettes, and objects that will not bear the heat of the ordinary method. The fineness of the deposit can be regulated by the strength of the bath.—*Journal of Applied Chemistry.*

Chinamen cost \$7,000 a hundred, delivered, in Tennessee.

Diversification of Industries.

Notwithstanding the low prices of most kinds of agricultural products, the farmers and planters in all parts of the country are actively engaged in putting in their crops, and as the season is an early one, we have no doubt the area to be devoted to the leading staples, will be larger than ever before. It is true that there is considerable talk at the South about planting more corn and less cotton, but the simple fact that no other crop will yield so ample a money return as cotton, even at current low prices, is sufficient to raise a doubt about the suggestion being acted upon by the planters to any considerable extent. In the West, the seeding of spring wheat and oats has been nearly completed, and the farmers are preparing for corn planting. In those States where winter wheat is grown, the plant is generally represented as looking well and the promise of a good harvest was rarely better at this period of the season. As the country grows in population and industries, more grain is required for home consumption, and it is altogether probable that the limit of our exports of breadstuffs has been reached. With a diversification of industries in the West, bringing the European laborer here to his subsistence, instead of sending subsistence across the Atlantic to the laborer, this limitation of exports is scarcely a matter for regret. Diversification of industries, indeed, is one of the first necessities of the country. It will bring into use our vast resources of water power and coal; it will add to the value of land by furnishing local markets close at hand. This will increase the value of all labor by multiplying its opportunities for exertion. It will sustain wages by competition among employers for laborers. It will relieve us from an important part of that exhaustive tax of transportation which devours the substance of nations by importing what they should produce, and exporting what they should consume. It will add an instant and enormous value to those vast stores of minerals and metals, hitherto comparatively worthless, and worthless because put to no other use than to sustain the surface of the continent, and hold the world together. Finally, by a diversion of capital and energy it will put a stop to the insane fury that so long as a fertile acre of land remains uncultivated now drives us to it, however remote, and then raises the cry for railroads and ship canals, to export its life to the ends of the earth. However great may be the natural productiveness of a country, without variety of employments its impoverishment is certain.

HOW TO MAKE PAPER TRANSPARENT.—The *Engineering and Mining Journal* says that artists, architects, land surveyors, and all who have occasion to make use of tracing paper in their professional duties, will be glad to know that any paper capable of the transfer of a drawing in ordinary ink, pencil, or water colors, and that ereo a stout drawing paper, can be made as transparent as the thin yellowish paper at present used for tracing purposes. The liquid used is benzine. If the paper is dampened with pure, fresh distilled benzine, it at once assumes transparency, and permits of tracing being made, and of ink or water colors being used on its surface without any "running." The paper resumes its opacity as soon as the benzine evaporates, and, if the drawing is not then completed, the requisite portion of the paper must be again dampened with the benzine. The transparent calico, on which indestructible tracings can be made, was a most valuable invention, and this new discovery of the properties of benzine will prove of further service to the art profession, in allowing the use of stiff paper where formerly only a slight tissue could be used.

Spots on the Sun.

Many theories have been advanced with regard to them. Galileo thought they were pitchy scum surmounted by clouds, thrown up from the heated body of the sun and wafted around on an illuminated atmosphere. But his means of observation were imperfect. It did not occur to him to use a colored glass, and his observations were confined to periods when the sun was near the horizon or veiled by clouds or fog. When they came to be better observed, this theory was abandoned, as well as many others that succeeded it. About 1773 Prof. Alexander Wilson, of Glasgow, advanced another theory, founded upon a careful examination of the aspects of the spots; which with some modifications from late discoveries, obtains at the present time. His idea was that they were conical cavities in the illuminated surface of the sun, analogous to cyclones in the atmosphere of the earth showing a darker stratum of the sun at the bottom. The normal condition of a well-developed sun-spot may be described as consisting of a very dark center, varying in shape, called the umbra, which is the lower and darker stratum at the bottom of the vortex, surrounded by a gray marginal disc, much larger, called the penumbra, which is the conical or funnel-shaped cavity in the luminous surface. Sometimes a still darker spot is seen on the umbra, called the nucleus, which is presumed to be the opening into a still lower stratum. The sun rotates in twenty-five and a half days; but as the earth advances in its orbit in the same direction, its apparent rotation to us is 27.3 days; and the average passage of a spot across the disc is about thirteen and a half days. As the spot first makes its appearance on the eastern edge of the hemisphere, it is seen only as a long, narrow line of the penumbra—as if one were approaching the crater of a volcano from a level, and got sight of the opposite side of the crater. The next day, as it advances, a glimpse of the umbra is seen, as if over the edge of the nearest side of the cone, and so on, till it approaches the center of the disc, and gives a view into the whole cavity, as if one were suspended in a balloon directly over the crater. As the spot rotates toward the western edge these aspects are reversed. It was from these appearances that Wilson founded his theory. We know now that what we see of the sun, except through these spots, and at the time of a total eclipse, is an intensely luminous envelope, called the photosphere, consisting of incandescent metallic gases, in which iron, copper, sodium, and many other metals are held in a gaseous condition by the intense heat. The idea now is that these gases, becoming cooled by contact with external space, or a cooler external atmosphere, are precipitated, and rush in descending currents toward the center, breaking away the photosphere, and exposing lower and less luminous strata. This is confirmed by the spectroscopic, which shows the presence of descending currents in the penumbra, and by stereoscopic views, which present the spots as funnel-shaped cavities. It was once thought that the umbra was part of a solid crust of the sun, if there is anything solid there; but the spectroscopic shows it to be composed of incandescent gases, in constant agitation, and it would doubtless appear luminous were it not in such juxtaposition with the photosphere.—*J. J. Dixwell in the Atlantic Monthly.*

The annual product of pepper in Sumatra is 28,000,000 pounds; Islands of Malacca straits, 3,000,000; peninsula of Malay, 3,733,333; Borneo, 2,666,667; Siam, 8,000,000; Malabar, 4,000,000, making a total of 50,000,000 pounds.

Black Lead Pencils.

The best black lead pencils are made from a natural ore of plumbago, obtained from Bourroardale, in Cumberland, but the more common sort from an artificial compound of plumbago dust and antimony. The lumps of pure plumbago, when scraped and freed from dirt, are of irregular form, varying generally in size between a walnut and an egg. These lumps are cut into slices by a circular saw, which is put in motion by the operator turning a winch and fly wheel with one hand, while he applies the lump of ore with the other against a metal face set at a proper distance from the disc of the sun, so as to act as a gauge or stop for producing the proper thickness in the slice. The saw runs vertically, and the ore is applied below it, the workman gradually raising it against the saw till the piece is cut off, when it falls down, slice upon slice, on a table below, these being of different sizes, from one to two inches in length, and of various breadths.

Pieces of cedar are cut by a fine circular saw into square prisms of the intended length of the pencil, or rather into such thicknesses that two of them together form a square, one of them thicker than the other, so as to admit the groove cut to receive the lead, to be in one piece only, this groove being ploughed out by a proper gauge plane. The operator takes one of the slices of plumbago brought to a straight edge into glue, then inserts it in the groove, and with a sharp instrument makes a cut on each side along the edge of the wood, when by a slight force it breaks off, leaving again a straight edge. This is now dipped again in glue, and inserted at the end of the last piece, and again cut off until the length of the groove is filled with the lead. The whole upper surface is then smoothed, and the other piece of wood glued on; the pencil is then square and rather rough.

It is now taken to be made round, preparatory to which it is passed along a circular saw, set to an exact gauge, and cut also to a certain length. In order to give it its cylindrical figure, it is passed through a square hole in an iron or steel puppet of the exact size of the pencil, and forced along by the workman. On the other side of this puppet is the revolving apparatus which cuts the pencil round, it consists of two gauges and a small iron plane, revolving around an open center. Beyond this is a cylindrical hole in a steel plate; as soon therefore, as the first end of the pencil is cut round, it is forced into this circular hole, and before the workman has lost the means of pushing it forward at the end that is square, the cylindrical end is pushed through the circular hole, so as to enable him to seize it with a pair of wooden nippers, and it is thus pushed and drawn quite through, and comes out beautifully round and polished.

France will have to pay 5,000,000,000 francs to Germany as a war indemnity. This, in five-franc pieces, would weigh 35,000,000 pounds avoirdupois. To transport all this gold by rail, supposing each car to carry 11,000 pounds, a train of 8,000 cars would be required. When spread out on the ground, one touching the other, these five-franc gold pieces would reach almost around the globe. If five-franc pieces enough to make this amount were placed one above the other they would make a column of gold 1,676 miles in height. If this column, having its base in Paris, should topple over in the direction of Berlin, Berlin would be only one-third of the whole distance reached by the coin at the top of the column. A quick cashier, able to count 10,000 five-franc pieces in an hour, supposing that he commenced at the age of 30, would be nearly 70 years of age before he finished counting it, in case he should count eight hours daily for 300 days every year.

WOOL IN ITS PASSAGE TO VELVET CARPETING.

The material passes from the wash to the combing machines, which separate the long from the short fibres. The long are passed through rollers, and assume a form called "sliver" which falls into a hollow cylinder set for its reception, while the short fibres vanish in a mysterious-looking box at one side of the room. These slivers are then passed through a drawing-frame, twenty or more of them united and drawn out so as to equalize the thread; eight or ten of these threads are again subjected to the drawing process and reduced to one. This operation is repeated as often as it is necessary to produce uniformity. These long fibres form the warp of the carpets, while the short are used for the "wool" or "filling." In the spinning-room both staples of the wool are placed on the "spinning-jacks," which operate with great rapidity. When it leaves the "jacks" it is in the form of coarse yarn, tightly rolled on large spools, then wound into skeins when it is ready for the dye house. By the American system of "folding" part of the yarn skeins are subjected to a parti-colored dyeing. Parti-colored yarns are used for warp. Other bundles of yarn are submerged in rolling steaming floods of colored liquids of every hue. Sulphur is used to bleach the portion intended to represent white. From the dye-room the yarn is conveyed to the drying-room and thence to the winding room. The threads are here wound on large cylinders for the printers, and each filling of the cylinder makes but a single thread in the warp of a pattern. These skeins, after being printed with one hundred or more shades of colors, and placed in boxes on a little railroad car are shoved into a boiler where from four to six pounds pressure of steam is applied. When the colors are thoroughly fixed, the skeins are dried and pressed through setting machines, when the yarn is ready for the Bigelow loom. These have on the end of each of the little wires used to rise the pile of the Brussels carpet, a small knife, which, while it weaves, cuts the pile and makes it velvet. The fabric is next subjected to the process of "shaving," and after that to the rolling machine. The carpets are then rolled marked with the number of the pattern of each roll, number of yards, etc., and are thus prepared for removal to the warehouse.

LOCOMOTIVE vs. HORSE.—Commenting on the figures given in the *Railway Review*, concerning the cost of locomotive operation on the Chicago, R. I. & Pacific Railway, the *Underwriter* says: "It appears that the average cost per mile is but 21 56 cents, or \$21 56 cents for 100 miles. A train of 20 cars containing 150 tons of merchandise may be drawn for this small cost. On a turnpike road, it would require 40 Conestoga wagons, with 200 horses, to do the same work at two miles an hour. So that it is fair to consider the value of a locomotive equal to that of 200 horses, with the advantage of doing its work in a tenth of the time and at less than a twentieth of the cost. The locomotive will work day and night when continuous service is required."

WATER-TIGHT CLOTHING.—Balard recommends the application of acetate of alumina for the purpose of rendering clothing impervious to water. The cloth is to be immersed in a mixture of solutions of acetate of lead and sulphate of alumina; by mutual decomposition of the salts, acetate of alumina is produced on the cloth, and when the goods are dried, basic acetate of alumina adheres to the fibre, and thus protects it from the action of moisture. The process is particularly recommended for military goods.

Railroad Items.

— Narrow gauge railroads, on account of their cheapness and their practicability in places where it would not be possible to construct roads of the ordinary width, are attracting much attention in some parts of the United States. A thirty-mile road is in process of construction from Cape Girardeau to the iron banks in Bollinger county, Missouri, of which one mile is finished. The cost of this mile, laid with T rail, has been \$6,537 60, and the cost of the entire thirty miles is estimated at \$213,000, allowing \$16,875 for bridges, culverts, &c. The road bed is 6 feet wide on top, following the rise and fall of the ground where it does not exceed 70 feet to the mile, and winding round high hills and steep grades in curves of 200 feet radius, less than one-third that required for the ordinary gauge. Rolling stock sufficient for the requirements of such a road—say 2 locomotives, 4 passenger cars, 30 platform cars and 10 box cars—are estimated at \$27,000 additional, making a total cost for road and equipments of \$240,000. For mining and all hilly regions the narrow track roads are peculiarly adapted, and they are also likely to come into extensive use as feeders to established lines of railway.—*N. Y. Sun.*

— The railroad companies of Great Britain during 1870 paid \$1,668,585 as compensation for injuries suffered on their roads. Of this amount the Great Northern Railway paid \$140,000; the Great Western, \$100,000; the Lancashire & Yorkshire, \$97,000; the Midland, \$124,940; the London & North-western, \$379,025; and the London, Brighton & South Coast, \$237,205.

— The freight shipped from California east over the Pacific Railroad in March was 2,744,346 lbs., or 75 per cent. increase over the February shipments. Most of the freight was shipped direct from San Francisco, including tea, coffee, silk, wool, hides, leather, hops, quicksilver, whalebone, &c.

— The following figures serve to show the magnitude of railway traffic in England and Scotland: On sixteen of the leading lines of road there are, 7,925 locomotives, 17,636 passenger cars, 135,990 freight cars, 9,575 cattle cars, and 63,750 coal cars.

— The railroad survey from Nevada city, via Grass valley, to Marysville, has been completed, even to the making up of the report by the engineer who made the survey.

— The track is now laying on the Northern Pacific Railroad at the rate of one mile a day, and over 3,000 men are employed in the construction of the work. Cars are running two miles beyond Brainard.

— The Lake Shore & Michigan Southern Railroad Company will shortly commence to lay a second track between Toledo and Buffalo, and from Elkhart to Chicago, using steel rails.

— Capitalists are now talking of building a thousand-mile railroad across the Andes, at a cost of \$30,000,000. It is to connect the Argentine Republic with Chili.

— There are in the world about 120,000 miles of railway, that have cost \$10,000,000,000, and give employment to over 1,000,000 persons.

— Eleven thousand and eighty feet yet remain to be dug through the Hoosac tunnel.

— The United States Supreme Court decides that surplus earnings expended by a corporation in improvements, &c., must, under the Internal Revenue law, be returned by the individual stockholders as income, and that national banks can not make loans on pledge of their own stock.

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CHARLES A. DANA, Editor.

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OF THE

Northern Pacific Railroad

RAPID PROGRESS OF THE WORK.

The building of the Northern Pacific Railroad, (begun July last), is being pushed forward with great energy from both extremities of the line. Several thousand men are employed in Minnesota and on the Pacific coast. The grade is nearly completed 263 miles westward from Lake Superior; trains are running over 130 miles of finished road, and track laying is rapidly progressing toward the eastern border of Dakota. Including its purchase of the St. Paul & Pacific Road, the Northern Pacific Company now has 413 miles of completed road, and by September next this will be increased to at least 560.

A Good Investment. Jay Cooke & Co. are now selling, and unhesitatingly recommend, as a Profitable and perfectly Safe Investment, the First Mortgage Land Grant Gold Bonds of the Northern Pacific Railroad Company. They have 30 years to run, bear Seven and Three-Tenths per cent. gold interest (more than 8 per cent. currency) and are secured by first and only mortgage on the ENTIRE ROAD AND ITS EQUIPMENTS, and also, as fast as the Road is completed on

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RECEIVER'S SALE.

Jacob T. Martz, Receiver of the Cincinnati and Mackinaw Railroad Company, plaintiff,

vs.

The Road Bed, &c., of said Railroad Company.

The State of Ohio, Darke County Common Pleas, No. 3,280.

By virtue of an alias order of sale made by the Court of Common Pleas, within and for the county of Darke, and State of Ohio, at the June Term, A. D. 1874, of said Court, in the above entitled case, and to me, as Receiver, appointed by said Court, of the said Cincinnati and Mackinaw Railroad Company, issued and directed, I will sell at public outcry, at the door of the Court-house, in Greenville, in said County of Darke, on

SATURDAY, MAY 6, 1871,

at the hour of 2 o'clock, P. M., of said day, the following described property, rights, franchises, &c., of the said Cincinnati and Mackinaw Railroad Company, situate and being in the counties of Darke, Mercer, and Van Wert, in said State of Ohio, to-wit: The Road Bed and right of way of the said Cincinnati and Mackinaw Railroad Company for a railroad, commencing at a point near Greenville, in Darke County, aforesaid, and extending through the counties of Darke, Mercer, and Van Wert to the town of Van Wert, in said last named county, in the State of Ohio, including the bridges, fixtures, and culverts, railroad ties on the same, or intended for the said road, together with the right of way owned and held by said Company for the construction of its said road, together with all the rights and franchises of said Company for the construction of and maintaining its road in the said State of Ohio, together with all other property real and personal, belonging to said Company, in said State of Ohio, intended to be used in the construction of its said road.

Appraised at Seventeen Thousand Dollars.

Terms of Sale, CASH.

W. A. WESTON,

Receiver, Cin. & Mack. R. R. Co.

C. CALKINS, Attorney; March 23, 1871.

23-3-70, 5t.

The Railroad Record.

E. D. MANSFIELD, - - - - } Editors
T. WRIGHTSON, - - - - }
A. J. HODDER, - - - - }

CINCINNATI, - THURSDAY, MAY 18, 1871

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Chesapeake & Ohio Railroad.

It is one of the curious things attendant upon the history of Cincinnati and its enterprises, that while the city, as a corporation, is often bold and enterprising, the great body of citizens who have wealth (and these are many), business, traffic, and stores, and who hope to increase all this, and grasp at every opportunity to advance their individual interest, seems to be utterly indifferent or careless to any effort or enterprise to advance public works for the benefit of the whole! In this they are in striking contrast with the citizens of not only New York, but of Philadelphia and Boston. The city of Cincinnati, as a corporation, subscribed stock to the Little Miami Railroad, the Whitewater canal, the Eaton road, the Covington road, and recently voted to pay out itself ten millions of dollars for the Southern road! What have the citizens done for themselves? How many of the men who in Cincinnati have accumulated great estates have ever put their hands to the wheel of public enterprise?

If the auditor's books were searched to see who had risen from nothing to independence or fortune in Cincinnati, how many of them would be found ever to have aided in any public work for the benefit of Cincinnati? We fear that record would be a most shameful one. It is perfectly true that taxes are high, but it is also true that they are, with small exception, not paid for any commercial or public enterprise. They are either paid for necessity or ornament, and much of it is wasted on useless things. But we have come to a time when, if the men of property, commerce and manufactures of Cincinnati do not

put their shoulders to the wheel, they need not expect any farther successful advance in business. Recently, Dr. Sabin and some members of the Board of Trade went to work and got a handsome sum for the Rockport road. This was well, and so far as a roundabout road through western Indiana and Kentucky can do any good it will be useful. But the good it does will be a mere trifle, compared with what would be done with a south Atlantic trunk line, which the Chesapeake & Ohio road will be. We have failed, and may as well admit it, in getting a Southern road through, and no man can safely say there ever will be one. Cincinnati offered ten millions of dollars to be expended in Kentucky, for her own benefit, and failed. Now what can be done? Full one-half the advantage expected to be gained can be gained by making the connection with the Chesapeake & Ohio road. The connection will be direct with the south-east angle of Virginia, and by the Danville road with North Carolina roads, and also with the South Carolina roads. All the south-east Atlantic would be connected directly with Cincinnati, and that is just the country which most needs Cincinnati productions. Now let us look this fact full in the face, and see what can be done about it:

1. The Chesapeake & Ohio is to be completed at an early day, for certain. If there ever was any doubt about it, there is none now. Something more than a year ago, the present energetic and able company began work anew. The whole line to the Kanawha valley was put under contract, and the grading is nearly finished. There are now about 4,000 hands employed on this work, going on with energy. The mountain section, the hardest and most costly, is, we believe, put under contract. In fine, it is certain that in a year or two we shall have a new grand trunk line to the Atlantic; and that line, when completed, will be a victory for Cincinnati, provided always that Cincinnati is connected with it by rail, and not otherwise. Shall it be? That is the question, and now let us consider that.

2. There are five lines proposed to connect the Chesapeake & Ohio with the West (not necessarily with Cincinnati), and only one of these has any capital or energy in the work, and that one, if it be successful and the others are not, is almost fatal to the interests of Cincinnati. This one is from the mouth of Big Sandy through Lexington to Louisville. The Chesapeake & Ohio, it is now understood, will terminate near South Point, or the mouth of Symmes creek. This is some 15 miles above the mouth of Big Sandy, to which the road will be extended. There has long been a charter for a road, and part of the grading actually done, from Big Sandy to Lexington. Now that work has been taken hold of energetically. The Kentucky counties have subscribed for it liberally, and a company of contractors have engaged in the work who are

amply able to carry it on, and who have large experience. That work is likely to be made, and where then will Cincinnati be? It seems to us, that if she fails with the Southern road, and then fails to make a connection with the Chesapeake & Ohio, she will fail totally in getting the Southern trade. Half of all she might expect of future commercial prosperity will have utterly failed? This is the situation exactly; and if anybody can see it in a better light we shall be thankful for the information.

3. Now, what means has Cincinnati of making a direct (for it should be direct) connection with the Chesapeake & Ohio? On the Ohio side, there are three routes proposed: 1st The river route, for which a charter was obtained, from Ironton through Portsmouth, Manchester, Aberdeen, Ripley and New Richmond. There is scarcely a doubt that locally this would be the most profitable route. It would certainly take the large class of coast passengers that now come to Cincinnati by steamboats, and a large part of the local freight. In one word, the road from Cincinnati to Ironton would be exactly like the Hudson River Railroad. You will say, where is Albany and the North? Depend upon it, the Chesapeake & Ohio to the Atlantic will be fully equal to that. But we do not mean to advocate any particular route, we only mean to show what can be done.

The second route may be called the interior route. This will likewise be by Portsmouth, but will not be by the river. It will pass as near as may be by the county towns of the counties of Adams, Brown and Clermont. Owing to the hilly country which will be passed over, the road would go about 1½ miles from Georgetown (Brown county), near West Union (Adams county), and through Batavia (Clermont county), by the east fork of the Miami, to a point below Milford, and thence into Cincinnati. This route has been surveyed, and from the corporation line of Cincinnati to Portsmouth is, we believe, not far from 90 miles. This is a very direct route, and may be made at not more than the average cost per mile. Now we ask, is Cincinnati so utterly lifeless—are the counties on the route so utterly blind to their own essential interests—that they can not make this road? Is Cincinnati so dead to all that concerns her own material interests that she can not do her part?

We shall resume this subject in our next number.

There are, in the eleven Territories of this country, including Alaska, nearly one thousand million acres of land, which, owing to the sparseness of the population, may be described as unoccupied. If the 40,000,000 who inhabit the States were diffused through this vast land-ocean, they would be almost as few and far between as the sails which, according to the popular idea, "whiten every sea."

Vanderbilt and the Erie.

Rumor has it that Vanderbilt has made so captivating an offer to the Erie managers that they can't very well resist its acceptance, and that the old Commodore is therefore likely to effect by purchase what he failed to do a few years since by Wall street intrigue and coercive measures.

It is well known that Vanderbilt has wanted to control the Erie, not only because he will rid the Central of its great competitor, but because he thinks under his policy it can be made to pay handsomely upon the sum it will cost to secure it. The game would undoubtedly be in the Commodore's own hands, because, if it does not pay under one tariff of prices another could soon be made that would remedy such little troubles, and there will be no escape for the dear public. They may take their choice, and be bagged by Erie or Central according to their humor, if they choose to indulge in any such freaks.

It is said that Mr. Vanderbilt and his family hold largely of Erie shares at low figures. If this is so, and this long neglected stock is brought up to the productive standard, a few more millions will be added to their already stupendous fortunes. At any rate, it can be made a good stock movement for the wily purchaser, because if he finds that Erie can not be sustained or be made to grow up to the profitable standard, he can under the flush the new management would be sure to create, drive it up high among the nineties, and at the poise unload, and either buy in again when the lowest effect of the reaction is reached, or leave it to be as it has been, the foot-ball of Wall street gamblers.

In any event we see how Mr. Vanderbilt and his friends will be very likely to make money out of the movement. And if Messrs. Gould and Fisk are to receive three millions of dollars as a bonus to quietly get out of the way, we can understand how they will make a nice speculation. But what are the public to gain by this operation? We fear they are the great drove of geese to be picked and made the subject of sport for these gamblers. We certainly have no reason to expect that the Erie road will be as well managed for the public comfort and convenience under such a change as it has been since Gould and Fisk have fairly controlled it. For say what we will of these men, they have made the Erie a first class thoroughfare, equipped it most gorgeously, and done everything in their power and more than was expected of them to make the traveling public upon this road comfortable and safe.

Indeed, this was their strong hold and right well they knew it, and just as well have they clung to it. The ups and downs of the stock, the opinions of Wall street or of the financiers of the world were nothing to them.

It was one of their favorite maxims "that Erie dividends were all paid years in ad-

vance" And another "that they were not working the road for the benefit of Wall street or Lombard street, but for themselves and the great public." And no set of men understood how to do this better than they. Popular approbation, they well knew, would give the road business, it mattered not what its stock was worth; and business brought money, and money, in connection with this general approval, went far towards (if not the entire way) controlling Legislatures, Governors, courts, juries and the press, and with these in their favor what could they not do? May we not ask what *did* they not do? And yet, all they did, sooner or later, was made to work for the good of the people, and therefore the people looked on amazed, wondering and yet approving. For what difference was it to them in this war of money whether one set had a little more or less than another. To them it was a rich game of "dog eat dog," and they enjoyed the fun, and particularly when the dog that caught the game for them was the winner.

We fear if this sale is made all this sport will be gone, and with it the low fares, the prompt time, the gay palace and drawing-room coaches, the elegant accommodations, the modern conveniences that these gentlemen have so admirably supplied, and that is provoked only by sharp competition, and we shall become the helpless victims of a monstrous and soulless monopoly.

The Great Cormorant.

For some months past the Pennsylvania Central Railroad Company have been negotiating with the New Jersey Railroads for the control of all these interests under a lease. So extensive an operation has caused a regular old fashioned ferment among the railroad men, capitalists, politicians, lobbyists and professional hangers-on of that little Commonwealth. Each of these classes have axes to grind and have been working as best they could to serve their interests regardless of how others fared. But in spite of these petty annoyances the negotiations have progressed until committees appointed by the *high* contracting parties have held a conference at Philadelphia, and after *eleven* hours debate, so says the telegram, all the provisions of the lease were agreed upon, and subsequently, with a few trifling alterations, this agreement was approved by the directors of all the New Jersey companies, and now it needs but the confirmation of their stockholders to pass into full operation. Upon this point it is said there will be no trouble, as the directors in their confirmatory action reflected the wishes of the leading and most influential stockholders of those roads.

We suppose that the measures must pass through similar stages upon the Pennsylvania Central side of the subject in order to render

it legal. But the result can not be questioned. The managers of this great concern have hitherto been so successful in their negotiations, and stand so high in their professions, that their wishes in this matter as well as every other relating to their trust will be unhesitatingly and unanimously approved.

So far therefore as all these requirements are concerned there is nothing in the way of a speedy conclusion.

But at the eleventh hour a disturber appears in the shape of a strong competitor who submitted proposals for these New Jersey roads quite as favorable and safe as those of the Pennsylvania Central, and offer in addition thereto a bonus of *a million dollars*. This is too big a sum to overlook in a trade that covers upwards of forty millions of dollars, and directly touches the interests of seventeen out of the twenty-one counties of the State. What it will all amount to is yet uncertain, but it is probable that there will arise a system of railroad diplomacy never before equaled in this or any other country.

The event is one of the most momentous that has shaped the history of New Jersey, and is therefore watched with the greatest interest, not only by the people of that State but by those of Philadelphia and the city of New York.

It is a little remarkable that New York parties have not been more conspicuous in this extensive transaction. They seem to have been struck dumb with the boldness and magnitude of the operation, or else to have considered that it would probably break down, and then they would make a rush for the ruins. In this they will undoubtedly be disappointed. One or the other of these strong parties will control these public improvements of New Jersey, and in either event they will be worked to the especial interest of Philadelphia. They are both enterprises of this city and favorites of the State of Pennsylvania, the one being the Central, and the other the Reading Railroad Company.

The Last Report.

THE RAILROAD MONOPOLY.—ANOTHER BIG COMBINATION.

SAN FRANCISCO, May 16 —Papers are being drawn here to-day, securing the most extensive and powerful railroad combination ever attempted in the world.

It includes the Pennsylvania Central and connections, from the seaboard to the Union Pacific terminus at Ogden, Utah, and on this side of the California Pacific, not the Central Pacific but the Valejo opposition line, which will be extended north to Goose lake, Oregon, and connecting with the Oregon railroad to Portland, possibly also to Puget sound. Thence to Christmas lakes; thence eastward along the south side to Snake river in Southern Idaho, making every connection with the Union Pacific at or eastward of Ogden.

This route will avoid heavy grades over the Sierra Nevada and complete a continuous line from the Atlantic to the Pacific independent of the Central Pacific, and will be constructed immediately, all the capital having been secured in Europe for the entire work. No subsidies are asked, and the work will be commenced within two months with all the force that can be placed upon it. This is not public here yet, but may be relied on as substantially correct.

The College Hill Railroad.

¶ A short paragraph in the *Commercial* of the 15th inst., intimates that the last effort to build a railroad to College Hill was only instituted for the purpose of enabling certain persons to sell property; and because there was no demand for real estate in that vicinity, the projected project was dropped. Though this may have been true of the former, it can not be said of this last movement.

The greatest difficulty to be overcome is the petty jealousy which always exist in small villages, and the fear that some one may make a little money often prevents a public improvement being consummated; these two causes have had the effect of temporarily delaying the construction of a road which would not only have benefited the stockholders, but all owners of property in College Hill, Mount Pleasant and vicinity. It can not be questioned but that, owing to the situation of College Hill, it is the most healthful site for residences within driving distance of the city. The prevailing winds in this portion of the country are from the West; and as no swamps or streams of any consequence are west of that point, nor indeed any where in the neighborhood, it is free from malarious diseases, while mosquitos are entirely unknown in that elevated region. The smell of factories, and the nauseating stench from Si-keckerian institutes and distilleries, never pervade and poison the atmosphere, as is the case on the hills north and east of the city.

The long hill, though very beautiful, has first to be overcome, however, before this delightful place is reached, and many who are not fond of driving, or whose means will not justify it, are compelled to find transportation on an over-crowded omnibus, and a change to railroad cars at Cumminsville, making communication between College Hill and the city not only disagreeable but difficult.

In these days, when the means of easy and comfortable traveling are so readily obtained, the omnibus is a thing to be used only in times of the greatest necessity, and should be dispensed with as soon as possible. A railroad to Mount Pleasant, passing through College Hill, would obviate all the difficulties of getting to those places, and make that region of country, the most eligible place in the vicinity of Cincinnati for residences; and as God has made it beautiful and healthful, a railroad would make it desirable. Though the hill is

higher than any surrounding the city, still it is not so high but that a railroad could be built easily within the limit of the grade over which a locomotive can ascend. With the right of way granted for nearly the whole distance, such a road could be built, and would pay handsomely upon the investment. To College Hill and Mount Pleasant run two lines of competing omnibuses, and if these are sustained by the present amount of travel, certainly a railroad with the additional and continually increasing travel would be a very profitable undertaking.

From your paper we have estimates and careful calculations of the cost of a narrow gauge railroad, proved by practical examples of railroads of that gauge built in different parts of the country. From these accurate statements, made by competent engineers, it may be safely said that a narrow gauge road can be built and equipped and put in running order at a low figure, and would pay well on the investment.

RAILROAD.

Narrow Gauge Railroads.

EDITORS RAILROAD RECORD.—In a late number of your paper we saw a letter dated Gallipolis, from Mr. Langley, president of the Gallipolis, McArthur & Columbus Railroad. From an examination of the map, we estimate the length of that line to be 75 miles, "and if heavy grades are adopted," he says, "in no case need they exceed 70 feet per mile." * * "Would it not be well to consider what amount of business their road would command at the start, and build their road to meet the demand?"

This is exactly what we have been advocating, but Mr. L. proposes to do it by the common gauge. He says: "They could regulate" the cost of their roadbed according to the amount of grade they gave it. If they had to run light trains in proportion to their capacity over their roads they pass with high speed over much higher grades than are usually adopted. When if running with trains up to the full capacity of their engines upon a narrow gauge, which they would undoubtedly have to do, if they took what might be half a load for the heavier engines upon the ordinary gauge, this will in all probability make the cost of running the narrow gauge as much if not more than the broad gauge.

Mr. L. also takes exceptions to our estimates of \$30,000 per mile; this is \$12,000 per mile less than the average cost of the railroads built in this State. He further says he thinks he can build a first-class road for considerable less than \$20,000 per mile. We doubt it.

But his principal argument seems to be against the capacity of the narrow gauge, and we will try to make a comparison between the capacity of the two systems. First. We will estimate that of the ordinary gauge, using the common engine and the ordinary class of

cars, weight of locomotive 30 tons, weight upon drivers 20 tons, one-sixth of which is due for adhesion, 6,666 pounds (gravity $26\frac{1}{2}$ pounds) deduct $26\frac{1}{2} \times 20$ plus 30, 10 tons on trucks and 20 tons tender, $\times 26\frac{1}{2}$ plus 8 friction, leaves 5,101 pounds available for traction at $34\frac{1}{2}$ ponnds per ton, $5,101 \div 34\frac{1}{2} = 147.8$ tons total load besides engine and tender. Now the weight of an ordinary car is when loaded 18 tons, divide 147.8 by 18, gives 8.2 car loads, or about 82 tons of freight. Let us now see what can be done upon a 3 feet gauge, and inasmuch as the Fairlie locomotive has been so closely identified with the celebrated Festiniog Railroad of Wales, we will adopt it for this illustration, although there is a 10 ton locomotive running upon a narrow gauge railroad into this city, which is made upon nearly the ordinary type of locomotives, that hauls a load of 60 tons of coal up a grade of 105 feet per mile.

A Fairlie locomotive weighing 16 tons, 1-6 for adhesion, 5,333 pounds, $26\frac{1}{2}$ due to gravity $\times 16$ deducted from 5,333 leaves 4,909 available for draught, this divided by $26\frac{1}{2}$, to which is added 8 pounds per ton for friction, gives 142 tons, total number of tons that can be hauled, this amount divided by 6; 4 tons load and 2 tons car weight gives 23 cars, or 92 tons of freight, or ten tons more per train than can be hauled upon the ordinary gauge with a 30 ton locomotive and gondola cars. And we have a report of Mr. Spooner, superintendent of the Festiniog Railroad, in which he shows that the earnings per train mile and the percentage of working expenses were less than those of any of the leading railroads of England. And we are fully satisfied that the economical working or the capacity of the 3 feet gauge railroads can not be justly used in argument against them, and we will further state that should break of bulk be urged, we can say that we are fully satisfied that it does not cost five cents per ton to transfer the load from the narrow gauge to the ordinary gauge in this city.

Respectfully,

PAUL BROTHERS.

¶ The accounts of the English telegraph system for the year ending 1st April have been made up, and the result is a revenue to the Government of half a million pounds sterling. Messages are now sent over all England at a uniform rate of one shilling for ten words, and the result of the reduction has been a large increase in the number, which probably exceeds ten millions annually. The system has been adopted of renting certain wires to newspapers during the night at a fixed rate of £500 a year. This has worked exceedingly well, and the newspapers making such an arrangement find it much to their advantage.

¶ The first knitting mill ever put up in the United States was erected and operated at Cohoes, N. Y., in 1832. The place has now 18 of these mills, which each turn out an average of about \$100,000 worth of knitted shirts and drawers annually.

Blue Ridge Railroad.

Gen. J. W. Harrison, in a letter dated April 18th, 1871, furnishes some facts in relation to the condition and progress of the work on this important enterprise, in which the people of Kentucky, and indeed the entire North-west, are so deeply interested. Gen. Harrison is a gentleman of great energy and prudence, and his heart and soul are engaged in the work. The letter says:

"For the last two years a competent corps of engineers has been kept almost continually in the field, revising the location and estimates, resulting in shortening the distance between Anderson and Knoxville at least fifteen miles, with a proportionate saving of cost of construction. By a change of location in South Carolina, all the tunneling in that State has been avoided, with a cheaper and shorter line, leaving but one tunnel of any length on the whole line, viz: Dick creek tunnel, near Clayton.

The policy of the company has been to confine the work to this tunnel—its completion requiring the longest time. That work is now so far advanced that it is no longer an obstacle as to time, but the whole road can now be made in eighteen to twenty months.

The unsettled state of affairs, and the general low prices of Southern securities, have deterred the company from forcing their hands, guaranteed by the State of South Carolina for \$4,000,000 (four million dollars), on the market. Again, the war in Europe has prevented an advantageous sale in that market, and the company has thought prudent to await events and only keep such work under way as would enable the contractors to finish the whole line in the time stated above.

The assets of the company, it is believed, if judiciously and economically administered, will be ample to secure the ultimate completion of the road, but it will, of course, require longer time, having to rely, perhaps upon a second mortgage or aid from other quarters.

The means of the Southern people being somewhat restricted, and the necessity for the development of our great resources most urgent, would it not be wise for the Georgia Railroad & Banking Company, the Augusta & Hartwell Company, and the Macon & Knoxville Company to agree to connect with the Blue Ridge Railroad—south of the mountains—say at Anderson, Pendleton or Walhalla, thus saving the heavy expense of the pass through the Blue Ridge, dangers and losses of short parallel lines generally devouring each other, and at the same time secure all the benefits of the connection, by expending the amount saved towards the construction of the Blue Ridge Railroad."

The Australian gold fields are famous for yielding large nuggets. In two years there have been found in one mining district two nuggets, weighing 15 pounds each, one of 17 pounds, one of 19 pounds, four of 20 pounds each, one of 22 pounds, one of 24 pounds, one of 27 pounds, two of 40 pounds each, one of 43 pounds, one of 50 pounds, one of 67 pounds, and now one of 93 pounds. These statements are officially verified.

The corn crop of the United States for 1870 was 1,100,000,000 bushels, a gain over last year of more than five bushels to the acre. The hog crop is a little over 20,000,000 tons, 15 per cent. less than that of 1869.

The Erie Railway.

The following sharp letter speaks for itself, and shows that the Erie interests in this city are in good hands. Mr. Shattuc is not only bold but he is able, as this document proves, to defend his trust and make all aggressors wince. He wields a most pungent pen:

ERIE RAILWAY COMPANY,
PASSENGER DEPARTMENT,
CINCINNATI, O., May 11.

To the Editor of the Cincinnati Times and Chronicle:

In your issue of the 10th inst. I find the following paragraph touching the interests of the Erie Railway, which claims to be a special dispatch from the Associated Press:

"An attempt was made on the night of Sunday, April 30, to throw the Express train No. 12, on the Erie Railroad, off the track, near Deposit. The train was descending Summit grade and approaching the station, when at Seward's crossing it ran into an obstruction. Its weight and speed, however, overcame the resistance, and the danger was escaped. The trackman on duty, after the train had passed, found broken ties on the track, and a fire on one side of the track which had been kindled during his absence. Two green hemlock ties had been placed on end in a cattle-guard across the track, and above these a heavy oak tie had been placed in such a position that the front truck of the locomotive would partially mount it, raising it from the track. The weight of the engine had fortunately been so great that the hemlock tie broke short off, and the oaken ties thus relieved shifted around, letting the wheels drop again. The watchman at once began removing the obstructions, when he was assailed by a shower of stones from a wood on one side of the road. He was compelled to abandon his work and procure assistance. Train No. 12 on this night was more than usually heavy, it contained the Directors' car, upon which were Gould and Fisk and several Division Superintendents who were on their way to the city to assist in arranging the new time table. If the effort had been a success it would have been attended with great loss of life. The grade here is fifty feet to the mile and the speed of the train is from forty to fifty miles an hour. The matter has not been made public before, as it was hoped a clue to the perpetrators could be obtained. Armed patrolmen have watched the road from Deposit to Susquehanna since the affair to guard against a repetition of the attempt."

Permit me to say that it would have been pretty difficult to have crowded more falsehoods in the same space. As a general thing there is some little foundation for such reports, and particularly when they are sanctioned by the "Associated Press," but in this instance there are no grounds whatever for the rumor. It is worked up entirely out of "whole cloth;" and from the minuteness with which it is narrated, and the care that is taken to leave the impression upon the public that such attempts are likely to be made again, I am convinced that it was concocted by some malicious person or persons for the purpose of disparaging the Erie and benefiting conflicting interests.

Upon reading the story, I at once made inquiry into the truth of it, and was astonished to learn that nothing whatever was known of it near the point where the obstructions were said to have been placed. A further

examination proved that the Express train No. 12 of Sunday night had, as usual, made its regular time—that none of its officers had reported to the home office anything about the obstructions spoken of, or any other. The watchman at Seward's crossing knows nothing of being "pelted with a shower of stones from a wood on one side of the road, nor from any other place." He reports every thing all right and as usual upon that night. I found also that neither Messrs. Gould nor Fisk was on that train, and that there is no popular dissatisfaction at Deposit or thereabouts with the Erie management, and that there are no patrolmen, armed or otherwise, more than the usual watchmen upon the line, "guarding the road from Deposit to Susquehanna to prevent a repetition of the attempt."

The whole thing is therefore a cluster of the basest of lies, that only a most fiendishly experienced ingenuity could have invented, and an effrontery that is reached only by long familiarity with the worst of published crimes.

Bad as is this report, I should hardly have noticed it had it not been preceded by many others of the same character for reliability and in the same spirit, and doubtless from the same parties. For months past there have been weekly reports (and occasionally oftener) of some accident or fears of one, or of some local indignation that might produce one upon this line. In nearly every instance I have found that either some trifling occurrence not even known to the passengers of the train and never noticed upon other roads has been magnified into a fearful catastrophe, or there were no grounds whatever to base them upon. There seems to be a systematic plan of attack devised to interfere with the well earned and merited prosperity of this great thoroughfare. All other efforts to render this road unpopular having signally failed, this, the lowest and meanest, because cowardly, being under concealment, and treacherous, striking where there is no reason to expect a blow, is, it seems, to be persistently applied, and the Associated Press and the newspaper press of the country are to be duped into aiding these villainous designs. That this plan will fail, as have all others, there can be no doubt, and if the parties, both principals and agents, engaged in this nefarious business are not brought to the punishment they so richly deserve, it will not be the fault of the Erie managers. Under such constant provocations silence or indifference is no longer a virtue, and the interests of the traveling public as well as those of the company demand the truth or falsehood of such rumors to be established, and that justice be meted out to the wrong doers, whosoever they may be. When it is known that these attacks are made maliciously by antagonistic interests, it will doubtless be understood by the people as a confession of the superiority of the Erie over rival roads. It is this fact, I have no doubt, that has prompted these assaults, as, if the matter is looked into a little, it will be found that they have increased in number and intensity as the road has increased in popularity. All this sort of thing will avail them nothing in the end.

A first-class road, with the cleanest and best equipment, and the most convenient and elegant accommodations, making good time with the smallest per centum of misfortunes, is a competitor not to be put down by false dispatches, or materially interfered with by the dripping venom of lying tongues.

Respectfully yours,

W. B. SHATTUC,
General Southern Agent.

The Knickerbocker Life.

The Superintendent of the Insurance Department of the State of New York has been making an examination of the affairs of this company, not in consequence of any charges against it, but in accordance with a law of the State of New York requiring it, and because he occupied an unusual amount of time in this operation, the agents of opposing companies, and certain policy holders who had attempted to impose upon the company and through the efficiency of the managers were foiled, began to drop the venom of suspicion from their slanderous tongues, and started a rumor that "all was not right," that "there was something rotten," &c., and such villainous hints as might be urged against the purest man or woman or the strongest organization. Those who know the old Knickerbocker best, had the largest faith that the official examination it was undergoing would not only set aside all these reports, but prove it one of the staunchest and best managed companies in the country.

Our readers will remember that the RECORD took this position, and from week to week insisted upon it.

The investigation is over, and the following is condensed from the report issued from the Insurance Department of the State of New York, dated at Albany, April 29th, 1871:

The Knickerbocker was organized in 1853, upon a capital of \$100,000, and for the first ten years its progress was slow. Since 1863, however, its business had rapidly increased, until, as appears by the annual statement of the condition of the company, December 31st, 1869, it had outstanding 22,078 policies, insuring the sum of \$66,398,439, with aggregate assets of \$6,680,965, and aggregate liabilities of \$5,860,701.

There were but three companies organized under the laws of New York which reported a larger amount of business done or more assets. The business of the company was done on the "note" plan, and consequently quite a large portion of its assets consisted of premium notes.

It had been intimated that note companies were quite careless in regard to the accuracy of the statement of assets, and that notes were frequently included among the assets which were, in fact, given for premiums upon policies not in force, and hence of no value.

The Knickerbocker being a leading note company, it was thought best to make, at as early a date as practicable, a thorough investigation of all its affairs, with a view to settling this and other questions, at least so far as that company was concerned.

The examination made has been most extensive and exhaustive. All the notes, amounting in the aggregate to over 25,000 in number, have been separately examined, a full list made and compared with the entries in the books, and they have, without exception, been found to be notes given upon policies in force.

Notwithstanding the thorough sifting to which the assets of the company have been subjected, however, I am happy to be able to state, that they amounted on the first day of January, 1871, to the sum of \$7,020,973 85, while the liabilities, including reserve fund

and capital stock, amounted to \$6,844,996 26 leaving a surplus of assets over all liabilities of \$175,977 59. This surplus, however, would be increased to \$550,662 84, by including the amounts disallowed as above stated, which are claimed by the company to be valid and available assets, thus showing the company to be entirely solvent and entitled to the confidence of its policy holders and the public.

Complaints have been made against this as well as other companies, of a want of fairness and liberality toward policy holders, but so far as the facts appear, from my investigation, I find that the Knickerbocker has honorably and promptly met and discharged all legitimate claims, the gross sum paid for such claims upon policies since its organization amounting to \$2,881,849 46, besides dividends paid to policy holders amounting to \$995,424 36.

In view of all the facts disclosed, I feel warranted in saying that the company is entitled to public confidence.

GEORGE W. MILLER,
Superintendent Insurance Department
State of New York.

The Tunnel Road Indispensable.

We heard a gentleman say that he thought the city should make several inclined planes or perpendicular lifts to enable all classes to get upon the uplands, and out into the fields and the open air. The fare to be only small, so as to keep up the works, which should be constructed to accommodate the multitude. But the reply to that is, that the task will be better done by private enterprise. The argument points out the obstacle of the river, which, although different from the hills, has to be overcome by specific appliances, which, of course, cost money to provide, and to keep up. Individual and corporate capital have addressed themselves to that undertaking, and they are serving the public satisfactorily. They might, no doubt, do much better, but then if the public had intervened, the service would be worse and the price higher than it was at the ferries or the bridge. Other works competing with these will have a constant tendency to bring down prices. On the other hand, such is the waste of public money, and the corruption and extravagance of officers, that we can not depend upon these means for constructing the modes of egress from the city to the region beyond the hills. Such works will be quite as remunerative as the ferries and bridges, if not much more remunerative, and we have no doubt that private capital and skill will accomplish everything. We see by the papers that the pioneer inclined plane which is, no doubt, to be built, is now in the hands of an organized company, and it will be constructed, to be soon followed by others.

But the tunnel railroad is the first and greatest means of getting out of the city, and settling vast numbers of people in homes all over the plains and valleys, as well as the hill sides north of Cincinnati, and upon the branches of Mill creek and the Miamis. The fare will be light, and for Sundays and holidays no doubt very ample accommodation trains will be run for light fares, which will by far be preferred to any other excursions from the residents of the city. Once in the country, and at the end of ten minutes' time, the passengers, male and female, can spread themselves over all the region round about in every direction. Who knows but the tunnel is to become the precursor of several others pier-

cing our amphitheater of hills in every direction. Gen. Durbin Ward has long since suggested that the great streets of the city which run north and south should not stop at the foot of the hills, nor run obliquely up, but should be produced on a line as straight as a gun barrel, right through the obstacle into the valleys beyond it—a most costly but magnificent project, which, we fear, neither this age nor its successors are likely to accomplish, for the reasons which forbid all public expenditure but what is indispensable. And yet, as the gentleman first quoted remarked, it is true that for the public health, which depends so much on ventilation and free supplies of fresh air, these tunnels, or planes, or lifts, which put people outside of the crowded city into the country, are more valuable than parks. But then in point of appearance they do not compare with the latter. Things useful are apt to be unsightly, and the American public is prone to sacrifice more to appearance than to anything else. The chances are also against their getting wiser as they grow older.

Let us have the tunnel from Deer creek valley as soon as it can possibly be done. The work is one-third advanced "into the bowels of the land" and the completion of it is in most competent and energetic hands. We wish them immediate and distinguished success. Another twelvemonth will, no doubt, testify to the near approach of the end, if not to the perfect work; and then seeing will become believing. Our fellow-citizens, when the thing has been done for them, will be willing at all events, to patronize the finished tunnel, and to swarm through it like prisoners liberated out from their narrow houses into the freedom of the common air, and the straightening of their cramped limbs. The whole region penetrated for a dozen miles by this chosen enterprise, will teem with population and employment. The hands of wealth, taste and labor will bring out all the beauties and qualities of the neighborhood, which will more and more be the favorite abode of mechanics and other men of active lives, as well as of retired and aged persons. A million and a quarter of dollars will accomplish the tunnel, twelve miles of double track steel railroad, and it will not take two years.

BALTIMORE AND OHIO EXTENSION.—The preliminary survey of the extension of the Baltimore and Ohio road from Pittsburg to Chicago having been finally completed; a report has been prepared with a careful comparison of the most available routes and an approximate estimate of the cost. It will be submitted and made public within a few days. The line will be an air line about 460 miles long, the grades light and the cost of construction less than \$20,000 a mile. The saving in interest thus effected, as compared with that of the Fort Wayne and Lake Shore roads, both of which were exceedingly costly, will be enormous, and greatly in favor of the Baltimore road. Property holders along the route are ready to subscribe one-half of the necessary capital. The line will be determined within a few days, when a large force of engineers will be put to work and the route located. By the time this is done, the cash subscriptions, we are assured, will be sufficiently large to float the bonds necessary to ensure the speedy completion of this work, which secures to Baltimore an unbroken and independent line to Chicago, and to Chicago a most important route to the seaboard.—*Baltimore Gazette.*

The Public Debt Statement.

The public debt statement shows a reduction during April of \$6,124,053; coin balance, \$106,463,979; currency balance, \$12,796,860; coin certificates, \$20,483,500. The following is an abstract of the principal points of the statement:

Debt bearing interest in coin:	
Bonds at 6 per cent	\$1,687,561,250 00
Bonds at 5 per cent.....	214,567,300 00
Principal.....	\$1,902,128,550 00
Interest.....	48,632,064 08

Debt bearing interest in lawful money:	
Certificates of indebtedness at 4 per cent.....	\$678,000 00
Navy pension fund at 3 p. c.	14,000,000 00
Certificates at 3 per cent....	36,345,000 00
Principal.....	\$51,023,000 00
Interest.....	286,166 00

Debt on which interest has ceased since maturity:	
Principal.....	\$3,069,012 26
Interest.....	509,090 01

Debt bearing no interest:	
Old demand and legal tender notes.....	\$356,096,800 50
Fractional currency.....	40,570,997 50
Coin certificates.....	20,483,500 00
Principal.....	\$417,151,298 00
Unclaimed interest.....	8,202 13

Total debt:	
Principal.....	\$2,373,398,860 26
Interest.....	49,435,522 85
Total.....	\$2,422,834,383 11

Cash in the treasury:	
Coin.....	\$106,453,979 34
Currency.....	12,796,860 63
Total.....	\$119,260,839 97

Debt less cash in the treasury:	
May 1, 1871	\$2,303,573,543 14
April 1, 1871.....	2,309,697,596 27
Decrease during past month	\$6,124,053 13
Decrease since Mar. 1, 1871	17,135,303 78
Decrease from Mar. 1, 1869, to Mar. 1, 1871.....	204,754,413 09

Bonds issued to Pacific Railway Co.:	
Principal outstanding.....	\$64,618,832 00
Interest accrued not yet paid	1,292,376 64
Interest paid by U. S.....	10,753,910 45
Interest repaid by transportation of mails.....	2,831,186 94
Balance of interest paid by the United States.....	7,922,733 51

Mechi says that, in 1852, England imported \$90,000,000 worth of cotton, manufactured it, supplied the wants of her own people, and had \$150,000,000 to export.

The spathic iron furnaces in Plymouth, which draw from the only large mine of this peculiar ore in the United States, make iron so tough that a hundred sledge hammer blows are required to break a bar of the pig, while ordinary iron can be broken by half a dozen. They use this year 9,000 cords of hard wood in charcoal, and make 6 tons of iron a day.

The navigable portion of the Missouri river amounts in all to 3,150 miles. The channel varies from 300 to 1,500 yards, except at low water when it is from 600 to 700 feet. The river and tributaries drains 518,000 square miles.

Reasons for Adopting the Narrow Gauge.

The Engineer of the Denver & Rio Grande Railroad gives the following reasons for adopting the narrow or 3 foot gauge:

1. Because it will cost less, and the company will have a proportionately less amount of interest to pay.

2. Because it will do all of the business—at, as is deemed certain, a less cost—and in that way permit the road to carry passengers and freight for a smaller compensation, thereby developing the mineral country much faster.

3. Because it will permit the company to make a uniform gauge in the mountains, with rolling stock so light that it can be taken to the mouth of every good mine in the mountains, without a transfer of the coal or mineral—which will be by far the largest traffic of the road.

4. Because they are convinced that they can make passengers fully as comfortable as the usual 4 ft. 8 in. gauge can—as the cars on that gauge are too wide for one seat (on each side) and too narrow for two. The broad or 6 ft. gauge was adopted to obviate the trouble of the narrow seats on the 4 ft. 8 in. cars; but it has been found to be a too costly experiment. This company hope to accomplish the object by the narrow gauge car, with one swing or pivot chair on each side—and increasing the number of cars in the train, instead of carrying ponderous cars for a few passengers.

The company have given the question due consideration, and are satisfied that the enterprising public of the Far West will prefer the cheap transportation, with a small neat passenger car, to the expensive luxury of thirty ton cars. Its officers believe that they have the best wishes of all good railway men, and are willing to risk their reputation (and what more can they risk?) on the narrow gauge.

G.

Regulating Railroads.

The new Constitution of Illinois requires that laws shall be passed to regulate and limit charges on railroads. Two bills on this subject have passed the Legislature. One of these bills divides the railways of the State into four classes, according to their gross annual earnings to the mile. Class A, includes all railroads earning over \$10,000 to the mile; class B, those earning between \$8,000 and \$10,000; class C, those earning between \$4,000 and \$8,000; and class D, all earning under \$4,000 to the mile, annually. The maximum charges per mile for passengers are regulated as follows: For class A, 2½ cents; for class B, 3 cents; for class C, 4 cents; for D, 5½ cents. Various provisions are also made in regard to details. The second bill deals with freight. It prohibits the collection of rates for a short distance greater than those charged for a longer distance; it enacts that no company shall charge more per mile for freight over any portion of the road than is charged for equal distances upon any other portion of it. No company is to be allowed to increase its rates between any two points, in consequence of any decrease of other rates required by the first section, and the charges between any two points are never to be increased beyond those charged on the same section on the corresponding day and month of the year 1870. One of these clauses, it will be seen, touches the much vexed question of pro rata

freight, the eternal source of conflict between railroad managers and those who live upon the lines of their road. The law settles the point distinctly, but adversely to the true interests of the road. Freight ought to be charged more per mile for a short distance than a long one, and so long as unregulated competition exists, the railroads must discriminate between through and way business, or lose all their through traffic. The latter generally brings a return business. The former does not. It seems proper to put rates down between points where there is competition, when it would be manifestly unjust to make that rate the law for the rest of the road.

The Illinois experiment in legislation will be looked upon with interest. It deserves a fair trial, and as fast as its imperfections are discovered, they should be abandoned. Out of all this some new facts bearing upon railway management will come, and some new lessons will be learned. The subject, in all its ramifications and possibilities, far outruns the sagacity of those who most intelligently discuss it.—*St. Louis Jour. Com.*

Suggestions for Improvement of Railways.

As usual after the occurrence of any severe railway accident, the recent disaster on the Hudson River Railway has showered upon us a large number of suggestions relative to the improvement of railways and their management, so as to obviate such disasters in the future. A great many of these suggestions emanate from men who have no practical knowledge of railroading, and so little theoretical knowledge as to render their suggestions of no value.

There are others, however, worth consideration. A Boston correspondent, referring to the numerous accidents which have lately occurred in depots by passengers stepping into or off from cars in motion, thinks railroad companies are morally responsible if not legally so, for accidents of this kind; since such accidents, resulting from carelessness or imprudence of passengers, might be prevented by a change in the construction and arrangement of platforms in the depots.

He points out the fact that the platforms are now placed so as to leave a space of about two feet between them and the cars. Persons walking along the edge of these platforms are liable to slip and fall off under the cars and be injured, and are sometimes crowded off in the rush for seats in trains.

He suggests that a uniform height for platforms in depots should be adopted, at least on the same road, and that perforated shield-plates be attached to both sides of cars, extending laterally so as to reach over and a little beyond the edges of the platforms, and joining the steps of the cars in a proper manner. Also, that shield-plates be placed between connected cars, to prevent passengers falling between them; and that also a bridge with side railings should be placed between connected cars.

He further suggests that cars should always be coupled and uncoupled from above, instead of from the side, as is usually the case, and thinks the details of these improvements will offer little difficulty to engineering skill, and entail very little additional cost upon railway companies.—*Scientific American.*

The deepest excavation in the United States is a copper mine in Lake Superior. It is 1,300 feet deep.

Railways and Population.

According to the annual railway statement for January 1, 1871, our good old State of Pennsylvania has at last lost her position at the head of the list, Illinois, with her prairie lands and cheap roads and land grants, having managed to get ahead of us. This results almost wholly from the enterprise of the great main lines of railway leading from Philadelphia, New York and Baltimore, in aiding the construction of new branches leading to St. Louis and to the Western extensions through Northern Missouri and Iowa. The same influences seem likely to keep Illinois ahead of us for several years to come, as the list shows that the number of miles of road projected in that State is 8,813, while the whole number projected in Pennsylvania is but 6,310. The history of railways in this republic, however, shows that any superiority of any other State over Pennsylvania in this matter can be but temporary, as the slow but irresistible progress made by the old Commonwealth is sure to put her ahead again in the long run. A glance at the cost of the roads already built will show the cause of our very gradual movement. From this it appears that 5,056 miles of completed and opened railway in Pennsylvania cost \$296,739,037, while 5,423 miles in Illinois cost but \$237,553,000. In fact, the cost of railways is much greater in our State than anywhere else in America, and in this respect we stand at the head of the list—that is, in the amount of actual capital expended upon the construction of our own roads. This arises, first, from the extremely rolling, broken, hilly and mountainous surface of the State, the numerous and expensive tunnels and deep cuts, etc. Many of our roads are shelves cut in mountain sides, while others, in order to find a practicable route, are often obliged to bridge the same stream a dozen times. In the prairie regions of Illinois, straight lines are the usual routes and heavy grades are unknown. As, however, the surfaces of Indiana and Ohio are very similar, and both States intervene between Illinois and the seaboard, it is odd that railways there make nothing like the same progress. Ohio has but 4,638 miles built, and Indiana but 3,277. In the heyday of the Western railway fever, all these States were ahead of Pennsylvania. It is worthy of note that, at the present time, the whole number of miles of railway built and projected in Ohio foot up only 4,800, and in Indiana, 4,865.

Comparing with these figures the census returns of the population, we find that Illinois has bounded ahead with amazing strides, while Ohio and Indiana have moved slowly. In the number of people, Illinois is now nearly abreast of Ohio, and far ahead of Indiana. We thus see that progress in population is gauged by the railway movement and it must be obvious that, if Illinois keeps on with her railway building, she can not fail to get ahead of Ohio in population, and give even Pennsylvania a sharp tug. In comparing our State with New York, we find that our growth in railways far exceeds that of our neighbor, and that our increase in population corresponds. We find, nevertheless, that New York has aroused herself in this matter, and that, although she has but 3,892 miles of railway built and opened, against our 5,056, she has altogether 5,453 miles projected, so that she is hard at work to make up for lost time.

In Pennsylvania, there are large sections that are uninhabitable without railways, as the products are ponderous and transporta-

tion laborious and difficult by any other means. And even in the old and well-settled counties of Eastern Pennsylvania the progress of population is slow, because of the deficiency of railways, as the people collect near the built-up lines and neglect other parts.—*Exchange.*

Origin of American Railroads.

Rev. Dr. Durfee, in the Biographical Annals of Williams College, thus refers to the early history of railroads in this country, in a notice of Dr. Abner Phelps, of the class of 1806. It was during his senior year that an incident occurred which subsequently led to the first propositions for railroads. Mr. Phelps, in reading an article in the "Encyclopedia," saw the account of the railroad used at Newcastle, England, to bring coal from the mines and slate from the quarries in Wales. It suggested to his mind the question, why not transport goods in the same way on common roads? It was often a subject of reflection; and his father being a member of the Legislature at Boston, he thus wrote, February 15, 1808:

"I see, by the papers, the Legislature of the State of New York has before it a proposition for a canal from the Hudson river to the great lakes. If they succeed, perhaps we may extend it through this State to Boston.

"But I believe it will be found that railways are better adapted to the climate and business of this country than canals. I wish you would propose a railway from Albany to Boston. Make it a great State road. The counties make roads, why not let the State make one? This will bring up a subject which ought to be investigated, and people had rather talk on such a subject than to be always discussing politics to no profit. Please, sir, to think of it; and if you see it in the same light that I do, you will propose it. Were I in the Legislature I should not hesitate, but should move it as the first object of attention."

This suggestion was not then acted upon. Dr. Phelps resided a few years at Reading, Mass., where he practiced medicine, and in 1816 moved to Boston. In 1826 Dr. Phelps was elected a member of the Houses of Representatives from Boston. The Legislature then held two sessions—one in June to organize, and one in January for business.

On the second day of the session (June 18, 1827), as appears by the journal, an order was offered by Dr. Phelps, of Boston, which was the first proposition ever made for a railroad before any legislative body in our country. An able and elaborate report was written by Dr. Phelps and presented January 26, 1827. The report was signed by the chairman and George W. Adams—a son of John Quincy Adams—and Emory Washington, since governor of the State, and by a singular felicity, a graduate of Williams College. The report closed with resolutions recommending a survey. The Governor, in his annual message, referring to the expected report, says: "Their report will come recommended by the assurance that their attention has been perseveringly directed to the interesting object of their commission, and that, short of the expense and labor of a board of scientific engineers, a better source of authentic information could not be resorted to by the government."

In the resolves, commissioners were appointed and surveys were made for the road. At the request of these gentlemen, Dr. Phelps accompanied them as chairman of the legisla-

tive committee, and devoted the summer of 1828 to the work at his own expense, exploring the whole route on foot and by his private conveyance.

Dr. Phelps always predicted, much to the astonishment of his friends, that "the railroad from Boston to Albany will one day be a street, lighted, and lined with houses and stores."

Dr. Phelps continued to reside in Boston until 1866, when he removed to Grantville, near Boston, where he now lives, in the full possession of his powers of mind and body, at the ripe old age of nearly ninety-two years.

Vegetable Candles.

In Austria, Moldavia, the Caucasus and near the Caspian sea, a vegetable wax of a yellowish color, fibrous structure and light specific gravity, ozokerite is found in large quantities. In its natural state this substance will melt readily, but will not burn alone on a light being applied to it. When cut into thin strips and wrapped around a wick it burns readily without further preparation. This substance has been introduced into England by Messrs. Siemssen and Field, and works for the conversion of the raw material into a white semi-transparent wax ready for the manufacture of candles have been erected at Battersea, near the city of London.

By means of a steam coil the crude material is melted in tanks and run to a series of stills holding from two to three tons each, in which the ozokerite is distilled.

The distilled material, as it comes from the condensers, is run into moulds and allowed to cool. The cakes thus formed contain an oily substance which is removed by pressing them between oil skins and canvass cloths in hydraulic presses. The pressed cakes are remelted and treated with sulphuric acid in another set of tanks, which are steam jacketed and provided with stirrers for mixing the contents. The purified wax is drawn off into kettles, from which it is run into moulds.

The prepared material is a hard white wax which melts at 140°, the melting point of paraffine being only 128°.

The candles made from this material are said to be of high illuminating power, but somewhat disagreeable to use, owing to the offensiveness of the smoke which arises when the candle is blown out. The use of an extinguisher would, however, remove this objection, or perhaps it could be obviated by other means. The chief of the by products is the oil previously mentioned, which is colorless, free from odor, and gives also a brilliant flame.

Charcoal filters have been suggested in place of the acid bath, but we are not informed whether they have been practically tested. We do not know whether a material like ozokerite exists in this country. It is very possible that it does; and in this case the knowledge of the method of making it a valuable article of commerce would probably afford a basis for a large fortune to somebody.

CHESAPEAKE AND OHIO RAILROAD.—Four thousand hands are employed along the line. The iron will be laid on 100 miles of new track this summer. It looks as if the road would get through to Ohio in 1872.

It has been estimated that at the present rates of telegraphing the people of the United States pay nearly twelve million dollars a year.

Quicksilver.

The following is the quicksilver produced in 1868, 1869, and 1870:

Mine.	1868. Flasks.	1869. Flasks.	1870. Flasks.
New Almaden.....	25,600	17,000	11,000
New Idria.....	12,300	10,450	10,000
Redington.....	8,700	5,000	4,546
Sundry others.....	2,100	1,150	1,000

Totals.....48,700 33,600 29,546

The exports to the different countries for 1870 and the three previous years were as follows:

To	1867.	1868.	1869.	1870.
New York.....	1,900	4,500	1,500	1,000
Great Britain....	1,500	3,500	.....	.....
China.....	10,011	17,785	11,800	4,050
Mexico.....	10,042	14,120	8,060	7,088
South America....	3,800	2,500	2,800	1,300
Australia.....	300	1,580	300	300
British Columbia	20	20	4	9
Other countries..	280	501	51	41

Total flasks....28,853 44,506 24,415 13,788

And our exports previously have been:

1866.....	30,287	1858.....	21,142
1865.....	42,469	1857.....	27,262
1864.....	30,927	1856.....	23,740
1863.....	26,014	1855.....	27,165
1862.....	33,747	1854.....	20,963
1861.....	35,905	1853.....	12,737
1860.....	9,448	1852.....	900
1859.....	2,399		

The tables prefixed show the total production from all mines on the Pacific slope to be about 4,000 flasks less than in 1869, while the exports have been 10,627 flasks less in 1870 than in the year preceding. The price a year ago was 60c. against 90c. at this date. The product of the Redington quicksilver mine for the year 1870 has been 4,546 flasks, the company having used only one-half of their reduction capacity. It is understood that the company is under contract for all the quicksilver they produce up to April, 1872, at \$40 per flask, and although this figure undoubtedly affords them a handsome profit, it is not difficult to see how, in view of the great advance in quicksilver (now selling at 90c. per pound, or \$68.85 per flask) they should prefer to produce, during the remainder of the contract, only the half of their known capacity, choosing rather to keep in their mine the rich bodies of ore which they have recently discovered, to be worked after the expiration of their contract, when it will yield them at least fifty per cent. more than if brought to market now. This policy may operate rather severely on consumers, by contributing to enhance the price of quicksilver, but it can not be denied that it is a very natural one for the company to pursue under the peculiar existing circumstances. The local sale of quicksilver for consumption on this coast has been, in 1870, 30 per cent. greater than in 1869, showing a noteworthy increase, in spite of the largely advanced price.

— A new style of railways will shortly come before the public of England under the title of the Pennier system. A single row of piles carries a continuous girder, on which the train runs, the carriages hanging down on each side to within a short distance of the ground. The carriages are so arranged that inequality of weight on one side to the extent of a ton will not affect the action. The small quantity of land required, cheapness of construction, and speed, are advantages claimed for it.

A simple method of restoring burned steel to a workable condition consists in immersing it in a preparation made by melting three parts of pure colophony in a crucible, and after it has become perfectly fluid, adding, with continued stirring, two parts of boiled linseed oil, care being taken to prevent the mixture catching fire, of which there is danger should the temperature be too high. A dark brown mass will ultimately be obtained of the consistency of syrup, which has the peculiarity that any piece of cast steel, however much burned, when immersed in it at a red heat, immediately recovers its original excellence; and should the operation be repeated several times successively, a quality of steel is obtained of a fineness much superior to that of its original condition. The tempering is best done at a dark red heat in rain water.

Emigration to Texas has set in earnestly. It is reported that 119,000 persons, with 1,664 wagons, from Tennessee and Georgia, have entered that State since last October. It is noticeable that a large number of freedmen are removing from the Northern and Border States to supply the vacant places of the white people leaving the older cotton State.

7-30 GOLD LOAN

OF THE

Northern Pacific Railroad

RAPID PROGRESS OF THE WORK.

The building of the Northern Pacific Railroad, (begun July last), is being pushed forward with great energy from both extremities of the line. Several thousand men are employed in Minnesota and on the Pacific coast. The grade is nearly completed 266 miles westward from Lake Superior; trains are running over 130 miles of finished road, and track-laying is rapidly progressing toward the eastern border of Dakota. Including its purchase of the St. Paul & Pacific Road, the Northern Pacific Company now has 413 miles of completed road, and by September next this will be increased to at least 560.

A Good Investment. Jay Cooke & Co. are now selling, and unhesitatingly recommend as a profitable and perfectly safe investment, the First Mortgage Land Grant Gold Bonds of the Northern Pacific Railroad Company. They have 30 years to run, bear Seven and Three-Tenths per cent. gold interest (more than 8 per cent. currency) and are secured by first and only mortgage on the ENTIRE ROAD AND ITS EQUIPMENTS, and also, as fast as the Road is completed, on

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Navigation, even in modern times, has by no means been on the comparatively safe footing that it now is. Among the evils experienced no further back than the beginning of the 18th century, an unrealized desideratum was a chronometer, which on long voyages would suffer so little variation that it might be relied upon for a near approach to the exact computation of time. At that period, England had arisen to the maritime ascendancy which she has had ever since, except for a very short period during our Revolutionary war, when it was interrupted in the interest of the ascending fortunes of the United States.

In the reign of Queen Anne, the British parliament made an appropriation of £20,000, which is \$96,800, as a reward to the man who should make a chronometer that should not vary more than a certain small time (particularized in the act), in a voyage to the West Indies. The sum offered would, according to the value of money then and now, amount to nearly \$200,000 in our existing currency, which is but about 11 per cent below gold.

Of course, there was competition for this magnificent reward—a reward worthy of a great, enlightened and scientific nation. It required a combination of some important scientific knowledge with extraordinary artistic skill to making chronometers, to obtain this reward. But Harrison obtained it—a man who had received nothing more than a com-

mon school education, and had long been a maker of watches and chronometers.

Let it be here observed that the term chronometer is derived from two Greek words, *chronos*, time, and *meter*, measure, and literally, in its primitive meaning, signifies an instrument for measuring time; but in its usual meaning in our language, it denotes that instrument for measuring time which is peculiarly adapted to the measurement of a ship's time in a voyage at sea. Unless hecalmed, or stopped by perilous accident, a ship at sea moves night and day. If he has not a good chronometer, a navigator at sea, on a long voyage, is sometimes in extreme danger, at night or in cloudy weather, of running on rocks or shoals before he is aware of them. By the chronometers in use before Harrison's time, his computation of distance would necessarily be erroneous. Often he would think himself many miles from land or shoal water, at the instant he was running upon some island or rock.

It is to Harrison, a pupil of the common school and the shop, that we are indebted for that greatly improved chronometer which largely diminished the dangers of voyages. He gave the first impulse to that improvement in them by which they have now nearly reached perfection.

The cotton manufacture, for its present admirable machinery, is indebted almost equally to two men, one of whom had no other education than a common school, and that which he owed to the self culture which made it practical. Compton was a highly educated man, but as I am illustrating the benefits of the common school, Arkwright is the person who illustrates my position. He was a barber by trade, but he possessed mechanical genius in a very eminent degree. Living in one of the cotton manufacturing districts of England, his thoughts were directed to the invention of a machine for spinning thread. He was very poor, and his wife thought that his time spent in the effort to invent the spinning jenny was unprofitably wasted. Suiting her action to her thoughts, she broke his models, made under his direction by a man of great mechanical skill. "Let me alone," said he, "and you shall ride in a coach." Having a diagram of his demolished model, he had another constructed by the same ingenious mechanic who had made the first. Thus far the good of the world and the great relief of the sex in after ages, this woman's rights assault failed of its intention. After efforts, somewhat prolonged, Arkwright obtained a patent. His only means to carry his invention into effect was to find a man of sufficient wealth and sagacity to invest his money in a cotton mill for one-half of the profits for a term of years. Such an one he found, who invested £8,000 (about \$40,000) in the business. The business, of course, was greatly profitable to both of them; and after the term of their contract

had expired, Arkwright had the exclusive use of his patent. In about fourteen years from the time he began the manufacture by the aid of his partner's money, he died; but such had been his profits from the commencement of operations, that he left to his only son (who was his only child), Richard Arkwright, two millions of dollars. Arkwright was knighted as soon as the success of his invention was certainly known. His son, Richard Arkwright, the heir of his estate, and who was more largely engaged in the cotton manufacture than his father had it in his power to be, died in 1843, and was supposed to be the richest private man then in the world. His estate was computed to be worth \$40,000,000. He had five children, all of whom grew up and were married.

Thus we see what additions to the wealth of mankind, their safety and their comfort, have actually been made by the awakened vigor of intellect which common schools impart to those who have had no other education. The examples which I have given, although among the most conspicuous, are but a few out of the many. Yet, without bringing into view any more examples of this efficiency for good, for vast and momentous discoveries and inventions, we may affirm, from these alone, without the slightest hesitation, that they have endowed commerce and social life with that vast activity and rapidity of travel and exchange which distinguish the present generation, not only from the ancient world and the medieval ages, but from all the ages that preceded it. Under the mighty power with which the common school invigorated the minds of these individuals, events would fly with so swift a course that seven years, ten years, twenty years, in which great overthrows and revolutions formerly occurred, are completed within a single year. Moreover, the ingenuity of Harrison has enabled the mariner to plow the ocean with much greater safety for a hundred and fifty years past. Arkwright's invention has for a hundred and two years been piling up riches in warehouses, and augmenting comfort in private homes. And yet its operations and effects in that century of time are but the faint traces and the image hardly visible of what it will do in the ages to come.

But if common school education, evolving the mighty genius which would otherwise lie dormant among the common people, has qualified particular men thus largely to influence beneficially the fortunes of mankind by discoveries and inventions, what may it not be expected to effect, what has it not done, to revolutionize the condition of nations, and change the whole aspect of human affairs, when imparted almost universally to the individuals of a nation? Almost with our eyes have we seen, assuredly with our ears have we heard, the sound thereof has reached us across the roar of ocean, what achievements

it has accomplished in the most recent wars of Europe. With measured step and formidable stride, lo, Prussia advanced into the arena of a war which wickedness and folly had declared against her. She shook off the dust of Jena, she remembers Magdeburg, and the insulting and most rapacious spoliation of her wealth and territory, remembers to avenge them. The governments that had nourished a system which denies common schools to the people in general, were about to reap in defeat and desolation the fruits of this guilty plan. Austria succumbed at Sadowa. Prussia, in a single campaign, vanquished her so effectually and the other States in league with her, that she stripped her and them of more than eight millions of people and added them to her own dominions. For more than fifty years Prussia had been giving to her people generally a good common school education. It was a system nobly adopted and sedulously cultivated by her government.

Four years elapse from this defeat of Austria to the commencement of the Franco-German war. Prussian common school education pursued the even tenor of its way, while colleges continued their useful instruction, and the military school prepared the young officer for the drill, the march, and the camp; and military preparation pervaded the policy of Prussia, who foresaw the coming storm. France hebelled Prussian aggrandizement with "envy, jealousy, and cankered spite." She looked with covetous eyes upon the Prussian-Rhenish provinces.

What has been the result resounds through the world. The prestige of the first Napoleon, and the military exploits of France in the Crimea in 1855, and in Italy in 1859, deceived many in their calculation with respect to her success.

The system of Louis Napoleon excluded common schools for the generality of the people, purposely and steadfastly. As a consequence, France has been prostrated more ignominiously than she was by the disasters of 1814. At that date she succumbed to banded Europe. Now she has succumbed, in a much shorter time, to Prussia and her German allies, comprising a population scarcely two millions more than the French population on that territory, which for more than fifteen years, partly in the closing period of the last century and partly in the beginning of this, waged successful war with the greatest powers of Europe combined. Now Prussia has displaced her from the pre-eminence she was supposed to have on the continent in western and middle Europe. Prussia, a second rate power even in the early part of this century, has become decidedly the most powerful of the European continental nations. Her common schools, properly organized, have contributed immensely to this wonderful revolution in her favor, and in the interests of the human race.

W. A.

Mississippi River Improvement.

The Mississippi river and its tributaries constitute the most important and valuable natural system of commercial highways in the world. On its bosom a greater tonnage floats, with more and varied traffic, than can be found on any other waters, the ocean alone excepted. Still there are tribulations and difficulties to be encountered and overcome, even on the Mississippi, and the Government has done much already to improve navigation on the main river, as well as the tributaries. Much is still left to be done, and will continue to be needed as long as the melted snows of the Rocky mountains flows down the valley to cool the waters of the gulf stream.

Nor is this all. The turbulence of the current in flood times often changes the course of the stream, and disastrous floods and overflows are the result, with an annual loss of millions. How these are to be prevented is a very important and interesting question.

Without professing to be an expert on this subject, it seems to us as a natural sequence that the true way to remedy the overflows of the Mississippi is not alone in leveeing the banks of the river, but in opening some other direct outlet to the gulf, by the way of some of the many bayous that lead from the river, and by doing whatever may be practicable to straighten the stream itself, whereby the fall would be greater, the current more rapid, sedimentation less, and the bottom of the stream scoured to a greater depth. At extremely exposed points the Craig batton piles of kyanized timber, should be sunk, to prevent the abrasions of the shore, the levees would then become of a more solid and permanent character, and the productive resources of the country increased.

The following interesting letter of Albert Stein, Esq., of Mobile, in this connection, is worthy of a most careful perusal:

"Captain A. A. Humphries and Lieut. H. L. Abbot (Report upon the Physics and Hydraulics of the Mississippi river; upon the protection of the alluvial region against overflow; and upon the deepening of the mouths—Washington, 1867—page 196), say:

"The area of the alluvial land under cultivation below the mouth of Red river is not less than 1,000,000 acres, which at \$100 per acre (by no means an extravagant estimate), gives \$100,000,000 for the value of the plantations in that section, making a total value of \$260,000,000 for the land *that will be rendered perpetually cultivable* by the expenditure of \$17,000,000."

And this great achievement is to be accomplished simply by erecting levees upon the margin of the serpentine banks of a very shifting and fluctuating river, having, in 1858, at high water, between banks, from the Ohio river down to the Arkansas river, a maximum width of 7,670 feet, and a minimum width of 2,240 feet; from the Arkansas river to Red river, a maximum width of 7,800 feet, and a minimum width of 2,350 feet; and bends extending laterally about ten (10) miles.

Our thesis is: That, without a proper regulation of the Mississippi river, it is utterly impossible to make the levees permanent, and consequently to render the alluvial land 'perpetually cultivable.'

It is certainly absurd to assert, that the low lands of the Mississippi river can be rendered perpetually cultivable simply by levees, regardless of the consequences of the general elevation of the bed of the Mississippi by the detritus, brought down from the higher regions by the river and its tributaries, or of the elevation consequent upon the reflex effect of the elongation of the bed of the river, by the deposits at its mouth, which elongation is estimated in the report at 700 feet per annum. The result is, that the floods of the Mississippi continually increase in intensity, and the levees necessarily become insufficient for the protection of the low lands against inundation.

The Mississippi river being in its natural state, the adjacent swamps and low lands were filled and covered with water in time of flood; they formed receptacles for the accumulation of a great quantity of water, and secured the lower portion of the river from the destructive ravages of high floods. These basins retained the waters until they were gradually discharged through the river, leaving in them a large portion of the detritus, thus lessening the deposits in the Mississippi.

These natural regulators of the bight of the floods being shut off, by enclosing the river between levees, the effect must necessarily be a raising of the surface of the water, and, in time of flood, to an alarming extent in the obstructed meandering river below.

It is also important to consider the ordinary causes of the inconstancy of the river, such as the sinuosities of its course, the variations of its width and depth, and the irregularities of its slope. In order to correct the evils resulting from these causes, it would be necessary:

1. To remove the prominent sinuosities which throw the current successively from one bank to the other;
2. To regulate the slope;
3. To establish a proper cross-section in proportion to the volume of water of the greatest floods;
4. To adjust the direction of the discharge of the tributaries into the main river;
5. To centralize the current so that the greatest depth and velocity may be in the middle of the bed;
- and, 6. To construct in the bed of the river such artificial works as may be necessary to maintain the uniformity of the section and slope, and to prevent abrasion and scourage, which destroy the regularity of the regimen.

Any system of improvement that will *effectually* regulate and confine the river by means of levees must be based upon these principles. But the advocates of the levee system have generally paid no attention to them, and have restricted themselves to the mere construction of levees upon the margin of the meandering river as the sole protection and universal panacea against floods. They have failed to apply themselves to the task of giving to the bed between the levees a particular form and direction; in one word, they have neglected the foundation of their work, and unavoidably it must come to ultimate destruction.

The regulation of the Mississippi would cost far less than the levees, which system, as heretofore in operation on its banks, is radically defective, and will never render the alluvial lands below the mouth of Red river 'perpetually cultivable.'

The total expenditures in Europe for education, science and art is more than \$100,000,000 per year.

Our Northern Railroad.

We learn from authentic sources, that arrangements have been completed by which the Pittsburg, Ft. Wayne & Chicago Railway are to furnish all the means necessary to complete the Richmond road between Winchester and this city.

This secures a continuous line from this city to Ft. Wayne, and thence into the pine lumber regions of the western slope of the lower Michigan peninsula.

The road is to be completed in eight months, and is to be worked by the Grand Rapids & Indiana Company.

This finishes another of those works concocted many years ago, and that has passed through almost every conceivable misfortune, yet, that never lost its value or importance, and is to-day better than ever it was claimed to be by its projectors.

The next work of the sort to be completed, is what was known as the Cincinnati & Mackinaw, now rebaptized under the new regime as the Cincinnati & Great Northern Railroad. This scheme was started about the same time as the Grand Rapids & Indiana, and very much under the same circumstances. The similarity continues by the afflictions this last named road has also passed through. There is yet, however, a gulf or two more for it to pass before it reaches the goal that has been attained by its Grand Rapids neighbor. There is no doubt, however, about its success. It is moving on with great rapidity, and with a power that will now override all obstacles.

There are springs at work in this great enterprise that are natural to it, and that have long been known to those who have studied the merits of this important work, but that have remained sealed until recent events broke them open. We hope, within the coming month or two, to be able to announce the revival of this old line, and with as strong backing as its westerly cotemporary has been so fortunate in securing.

The Atlantic & Erie.

A telegram of the 22d said that, on that day, ground was broken on the lake division, Bucyrus to Toledo, of the Atlantic & Lake Erie Railway, amid the ringing of bells, the sounding of the steam whistles of the various manufactories, and in the presence of an immense concourse of citizens.

Speeches were made by Probate Judge R. Lee, chairman of the meeting, followed by Messrs. James Clements, W. C. Lemert and D. W. Swigart, the president of the road. The strongest assurances were given of the ability of the company to iron and equip the road, and the work of construction will be pushed with vigor.

More bricks are made in Philadelphia than any other city in the world.

The Big Lease Approved.

The public interest in the lease of the New Jersey improvements has not abated in the least since the movement was made public. It has undergone discussion from every conceivable standpoint, and its effect, pecuniarily and politically, has been duly considered.

The remarkable feature about this measure thus far is, that the anti-lease sentiment has not made much headway. As a general thing, so vast and complicated an operation, when publicly discussed, invokes a bitter opposition that makes a very strong fight. But in this case, either through good management or the merits of the proposition, the opposition may really be said to have become weakened.

The first test of the project was had on the 19th ult., in the Joint Board of Directors of the United Companies of New Jersey, and was approved, and subsequently recommended to the stockholders for their adoption.

There were twenty-five directors present, and upon a final vote sixteen of these were for the lease, and nine against it.

At once, the following gentlemen were selected as a committee to present the lease to the stockholders and secure their endorsement of it: Samuel Welsb, R. F. Stockton, John G. Stevens, A. L. Dennis, Cambridge Livingston and Ashbel Welsh.

It is generally understood that the lease will be ratified, and is regarded as a foregone conclusion.

Personal.

Isaac B. Riley, the Engineer-in-chief of the Newark, Somerset & Straitsville Railroad, spent an hour with us a few days ago, and told us all about the progress and prospects of the work upon his road.

We were pleased to learn that this old and valuable project has finally fallen into the hands of enterprising and practical men, and is now going ahead at a rate that insures its completion within a very short time.

Mr. Riley has brought his experience and skill to bear upon this work, and made many alterations in it from the original designs of its projectors, and that not only reduces its cost, but at the same time renders it in every other respect more desirable.

For such a purpose no man is better qualified than Col. Riley. He has been long in the practice of his profession, and possessing rare natural qualifications for it, he delights in those innovations that produce just such results as we have mentioned.

This road is now opened from Newark, in Licking county, to Somerset, in Perry county. In a few months more it will be completed to Straitsville, the locality of that marvelous coal deposit of which we have written so much, and of which so much more may yet

be written without exhausting the subject, and that will give this road an enormous business and quickly make it one of the productive schemes of the State.

Peddling and Selling by Sample in Kentucky.

We have had several inquiries in regard to the legality of merchants selling goods in the State of Kentucky *by sample*, or as is usually practiced by that class of persons known as *runners*. We have therefore been at some pains to obtain correct information.

The following notes from Hon. John G. Carlisle, with the copy of the law and the decision of the Court of Appeals of Kentucky, will make the matter plain:

Covington, Ky., April 28, 1871.

Hon. THOS. WRIGHTSON,

Dear Sir:—Your favor is just received. See vol. 1, page 104, chap. 842, Acts 1869-70, for the law on the subject of selling by sample.

No local license would be required in Covington, and I think none in Newport.

Yours, &c., J. G. CARLISLE.

AN ACT to amend an act entitled "An act to amend the several acts in relation to peddlers," approved March 4th, 1856.

Be it enacted by the General Assembly of the Commonwealth of Kentucky:

SECTION 1. That the act entitled "An act to amend the several acts in relation to peddlers," approved March 4th, 1856, so far as it may apply to itinerant persons vending goods, wares, merchandise, or other things, or offering to vend the same by sample, which are not the products or manufacture of this State, be, and the same is hereby, repealed, to the extent that the said act shall not apply to, or be enforced against, merchants or their agents, residing in or out of this State, who may vend, or offer to vend, by sample, goods, wares, merchandise, or manufactures made within or without this State, to merchants, dealers, or other persons living within the State.

SEC. 2. That in lieu of the license required to be obtained by the act referred to in the first section hereof, the persons named therein shall be required to obtain a license for the whole State, to be renewed every twelve months, and for which they shall pay a tax of two hundred dollars (\$200), to be a part of the revenue proper; and the same shall be governed and regulated by the provisions of section four, article two, chapter eighty-three, of the Revised Statutes, so far as the same are applicable, and said section to that extent, is hereby re-enacted.

Approved March 18, 1870.

Covington, Ky., May 9, 1871.

Dear Sir:—The Court of Appeals did decide last winter that selling by sample was not peddling, but I have not seen the decision for a long time, and do not remember the precise language used. I suppose, however, that if any city or town, having authority to do so under its charter, should pass an ordinance expressly requiring a license to sell by sample, the courts would enforce it. My recol-

lection of the case is, that an ordinance prohibiting *peddling* without a license was held not to embrace sales by sample

Yours, J. G. CARLISLE.

FRANKFORT, Ky., May 18, 1871.

Hon. T. WRIGHTSON,

Dear Sir:—Below you will find a correct copy of the decision of the Court of Appeals of Kentucky, as requested by you.

Truly yours, W. P. D. BUSH.

COURT OF APPEALS OF KENTUCKY.

Commonwealth of Kentucky
vs.
Jones.

Opinion delivered January 20, 1871. On appeal from Lincoln Circuit Court.

HARDIN, Judge.—The appellant having, in October, 1870, as the traveling agent of Charles H. Waters & Co., wholesale merchants of Cincinnati, Ohio, offered to vend the goods of his principals, by sample, in the town of Stanford, Ky., to W. S. Hocker, a merchant of that place, he was arrested, tried and fined in the sum of \$100 for so doing, as for a violation of the act of March 4th, 1856, in relation to peddlers (2 R. S., 276), he not having obtained a license as a peddler, as required by that statute. That judgment was reversed on an appeal to the Circuit court, and from its judgment the Commonwealth has appealed to this court.

The only material question presented for decision is whether the provisions of the act of March 18, 1870 (Session Acts, vol 1, p. 104), repealing the act of 1856, as to "merchants or their agents residing in or out of this State, who may vend or offer to vend by sample, goods, wares, merchandise or manufactures, made within or without this State, to merchants, dealers or other persons living within this State," exempted the appellee from liability to the fine imposed by the inferior court.

Although the second section of the act imposed a tax in lieu of the license fees required by the act of 1856, we are of the opinion that the effect of the entire statute is to exempt permanent merchants and their agents, such as the appellant and his principals appear to have been, from responsibility under the act of 1856, leaving it only in force as to itinerant peddlers in the usual or popular meaning of that term, as contradistinguished from permanent or localized merchants, and that the Circuit court properly so adjudged.

Wherefore the judgment is affirmed.

CHESAPEAKE AND OHIO CANAL.—The report shows the earnings of the canal company for the month of March to be \$34,000, and the total expenditures for the month to be \$16,000. The amount appropriated and paid by the canal company since August, 1870, to this date has been for overdue coupons on the repair bond debt, \$116,560; one-half principal and accrued interest on same since July 1, 1869, \$110,850; making a total of \$227,410. The prospect of retiring the whole of the repair bonded debt during the present season is now very good. After this the overdue coupons of the preferred bonds are the next payments in priority, in accordance with the decision of the Court of Appeals. An order was adopted to remove the general office to Frederick.

Book Notices.

Messrs. Geo. E. Stevens & Co., of 39 West Fourth St., successors to the old publishing house of Geo. S. Blanchard & Co., placed upon our table a clean and well printed cheap copy of Wilkie Collins' best work, "Basil, or The Crossed Path, a Story of Modern Life."

Mr. Collins is so capital a story teller, and so ingenious a plotter, and withal so favorably known to the reading public of England and America, that he is accorded about the highest place among living English novelists, and his name is sufficient to insure a general reading of anything he may give to the public.

No one who has read either of his former works, will forego long the rich enjoyment to be found in "Basil, or The Crossed Path." Here the story is full of that mysterious and complicated plotting for which Mr. Collins is more famous than any other writer of fiction; and it is as well sustained, and as full of thrilling interest, deep passion, and real pathos, as his popular "Dead Secret," or "Woman in White." The style is pure and simple, yet grand. It flows as easily yet as powerfully as a great river, and its strong words and finished sentences lead one along to most magnificent climaxes.

There is no misunderstanding what this popular writer means—no confusion in his ideas, and no verbal muddling in his expressions. He tells his story so naturally, and in every respect so well, that to commence it is to secure its complete reading—having read it you are sure to remember it—the best possible evidence of its power.

We predict for this work a demand equal to anything this gentleman has ever written, and we shall not be surprised if it should prove his most popular, as it is his best book.

THE WESTMINSTER REVIEW for April: The Leonard Scott Publishing Co., N. Y. The welcome face of this substantial quarterly greeted us on Thursday last. It is a good number, containing articles upon the following subjects: Aristophanes; The American Republic, its Strength and Weakness; Thomas Hood; Battles in the Church; Public School Teaching; France, the Jesuits, and the Tientsin Massacre; Ste. Beuve; Army Organization; and the usual recognition of contemporary literature under the heads of its several departments.

The paper on "The American Republic, its Strength and Weakness," will doubtless be read by our thinking men with great interest. And although there is nothing new in its statement of facts to the intelligent American, there are conclusions reached, and hints and suggestions thrown out, that we shall do well at least to consider.

Our strength as a nation we have never doubted, indeed it has been a subject of na-

tional boasting; but the weakness of the republic we have heard only from other countries, or during one of our great political feuds, when each party was struggling for the ascendancy, and each warning the country of the absolute ruin the success of the other would surely bring about.

Since our late war, we claim respect for our military strength and skill, and the removal of the great causes of that internal element that threatened so long the conflict that finally came, has given our people faith that all other weaknesses are trifling, and like this great one that was overcome, will be converted into strength.

This is a most hopeful view of the situation, we confess, yet it is one generally entertained, and is such an appeal to our patriotism, that it is well enough probably to indulge it.

The article upon Thomas Hood will be found a most readable and gratifying paper. Without being excessively eulogistic, it nevertheless was written by an ardent admirer of that strange yet great man, and lets the light into his daily living, where men are to be better seen and more accurately judged than from what the world merely knows of them.

We have always liked the "poet of the poor," but now that we know more of him, his trials, his afflictions, and in the midst of these, his true manhood, his never-failing sympathy with human suffering and distress, his uncompromising cheerfulness, to say nothing of his acknowledged ability, and inexhaustible wit, our liking is converted into admiration akin to love.

All the other articles are of the first order, and worthy of a most careful reading.

The Beckel House, Dayton.

It is very rarely that we notice in our columns the hotels at which we happen to stop, but in this case we must make an exception, because this house, by reason of its spacious apartments, cleanliness, elegant furniture, splendid table, gentlemanly clerks and prince of proprietors, rises so far above many of the most pretentious of first-class hotels, that what we say of it is not puffery, but a recognition of real merit, and a notice to the traveling public that whilst "The Beckel" claims to be a first-class hotel, it is not, like many others, only so in price, but in every appointment and particular, even to the fullest satisfaction of the most exacting of travelers.

This is not our testimony alone, but that of every one, we believe, who has stopped there since Mr. Reibold became its proprietor, and so it will be of all those who may stop there hereafter, if the same good qualities are sustained, which is sure to be the case whilst the present landlord commands. We wish him the highest success.

Our Railroad Accommodations Locally.

The *Railroad Record* is making a steady effort to keep alive the scheme for getting out of the eastern part of the city through the old projected tunnel. Its labors are commendable and arguments from every standpoint are forcible, yet they seem to produce but little impression, at least on those persons and corporations who are in position to be most benefited by the undertaking or best able to carry it forward. That our East and West roads have made a mistake in their neglect of the advantages to be afforded by that entrance to the city can not, we believe, in view of all the points involved in the matter, be doubted; especially has this seemed to be the case with the Baltimore and Cincinnati—*nee* Marietta line—extension. But the Pennsylvania road has also missed its opportunity there; and now that the Dayton Short Line has become allied with the Baltimore and Cincinnati line for the use of its depots and tracks, there only remains the provision for the accommodation of the Chesapeake and Ohio road extension to make probable the application of the Deer Creek valley to the uses for which nature has so especially well adapted it.

There is a prominent reason why this is to be regretted that does not relate alone to the accommodation of any one road, and that is, we fail to establish that thorough environment of the city with roads that will best effect their exchanges one with another. There will, at no remote day in the future, be a necessity for having a Union Stock Yard, accessible to every road centering here, not only for the transfer of stock from one road to another, but convenient for the local business of the city, so that we shall be able to dispense entirely with the driving of stock about or through the city. There will be—indeed, there is now—a demand for easier and less expensive handling of the articles of our commerce and manufactures, and to this end it will be necessary to afford opportunities for the receipt and delivery of freights right at the doors of our stores, factories and warehouses. There must, consequently, be a railroad policy or local management that shall make these things possible, and for its accomplishment the opportunity of getting out of the eastern side of our city into Mill Creek valley becomes a necessity for the best accommodation of great industrial and commercial growth.

There has been talk of the establishment of a Union Stock Yard in Mill Creek valley, somewhere near the Harrison road. This would answer only partially the end in view, and could only be a temporary provision, since in a little while the land would become too valuable for such uses, and the growth of the city about it would make its removal necessary on sanitary grounds. It is well not to be short-sighted about these matters, and to take such steps in arrangements for our future commerce as will not have to be receded from. And even though the eastern part of the city should be paralyzed by the absence of a desirable outlet, it will be well to consider how best to combine the other advantages we have for accommodating the commerce of our city.

In this connection, it may be well to advert to the fact that the extending and increasing facilities that are being afforded for sending the population of the city on to the neighboring hills, makes more possible the extension of every needed convenience in the way of easy and cheap local transportation to the

materials of our commerce, and there should no more be heard stupid objections to the transit of cars through our business streets and avenues wherever our merchants and manufacturers may require them for convenience in receiving and shipping their property.

Let it be hoped that a timely movement may be made to facilitate an easy exchange of the traffic of our railroads and promote the economical handling of the materials of commerce.

Much of what is said in regard to the accommodation of our commerce will apply as well to passenger transportation, but the former is of the greater consequence.—*Commercial*.

AN INTERESTING COAL HISTORY—The year 1820 marked the beginning of anthracite coal mining in this country. The population of the single county of Schuylkill and the tons mined were as follows at the beginning of each decade since 1820:

Years.	Population.	Tons mined.
1820	11,319	865
1830	20,784	89,984
1840	29,081	452,291
1850	63,265	1,712,107
1860	110,173	3,270,510
1870	133,000	4,478,969

The population and production of the same period, in the entire 170 square miles of anthracite coal lands, were as follows:

Years.	Population.	Tons mined.
1820	20,000	865
1830	45,000	174,434
1840	70,000	804,384
1850	130,000	3,358,890
1860	220,000	8,412,946
1870	320,000	15,723,033

The amount of anthracite coal yet in the earth is as follows, the area and the thickness of the veins being accurately known:

	Square miles.	Depth of coal, yards.	Tons.
Central coal fields.....	126	15	5,854,961,000
Southern coal fields.....	146	25	11,308,842,000
Northern coal fields.....	198	15	9,179,872,000
Total	470	...	26,343,675,000
Deduct one-half waste in mining.....	...	...	13,171,837,500

Which leaves of marketable coal, 13,171,837,500 tons, or a deposit equal to an annual supply of 20,000,000 tons for 600 years.

Within a circle of 100 miles, of which Pittsburg in the western extremity is the center, there is enough bituminous coal in the earth to pay off the national debts of all the governments in the world many times over. And it has been estimated from geological surveys, that this coal would pay our national debt fifty-four times if its stupendous value could be realized at once.

Far down in the mines (in some instances as much as 1,500 feet below the level of the rivers,) we have, in the small anthracite region, more than 400 miles of railroad not included in the aggregate of railways in the State. These subterranean railways would, if formed into one continuous line, reach from Boston to Washington, or they would form a double track from Philadelphia to New York and back again. These facts are all the more remarkable, as the production of grain and gold was \$6,000,000 less in 1870 than in 1869.

A firm in England is now making leather belting by sewing the band along its entire length with a pliable metallic wire. This operation is said to increase the strength, durability and adhesion of the belts, without lessening the required flexibility. It is said, however, that the method is only serviceable when applied to leather of the best quality.

Springfield & Cincinnati Railroad.

THE CONTRACTS MADE FOR BUILDING THE ROAD
—PURCHASE OF PROPERTY IN THE CITY.

The directors of the Springfield & Cincinnati Railroad (Dayton Short Line,) yesterday awarded the contracts for constructing the road between this city and Dayton, or rather between Spring Grove and Dayton, for it must be remembered the new road is to use the track of the Baltimore & Cincinnati Railroad through the Millcreek valley.

The contract for the earthwork on the first division lying between Spring Grove and Middletown, a distance of twenty-four miles, was awarded to Snell, Denton & Co.; masonry to Bates & Bates.

In the second division—Middletown to Dayton—twenty-four miles, the contract for the earthwork was awarded to Wm. B. Chamberlain, of Hannibal, Missouri; masonry to James Hamilton & Bro, of Piqua, Ohio.

The work of bricklaying falls to the lot of Wm. B. Chamberlain.

The contracts for constructing the bridges have not been made, the bids being so nearly alike that it has been difficult to reach a conclusion. The track will be laid with steel rails from the Cleveland rolling mills.

Work is to be commenced within fifteen days, and the road is to be ready for the rails by the first of February, and to be completed for the cars on the first day of April next.

The terms of the contract, though not made public, are satisfactory, the work having been contracted at as low a rate as is consistent with speedy and substantial construction.

As additional news, it may be stated that of late extensive purchases of real estate in the city have been made by the new company, amounting in the aggregate to \$384,500. The lands bounded by Fifth and Front and Indianapolis, Cincinnati & Lafayette railway track, with the exception of that part occupied by Ross, Pettibone & Co., have been purchased for a lumber depot, making 175 feet front on Fifth street. On the south side of Third street, between Wood and Mill streets and extending to the Indianapolis, Cincinnati & Lafayette Railroad track, the larger part of the property has been secured; also the greater part of the real estate lying between the track and Front street and Wood and Ramsey streets is to be used for freight houses, &c.

The passenger depot will be the present Plum street depot, which will be occupied jointly by the Indianapolis, Cincinnati & Lafayette, Marietta & Cincinnati and the Springfield & Cincinnati Railroad Companies.

It will thus be seen that the new enterprise has blossomed into substantial fruit, and that the good citizens along the line of the proposed road, many of whom have been inclined to look with incredulity on the proposition to build a short line road, will soon have demonstrations that will be quite conclusive as to the intention of the parties who have the management of the enterprise.

According to the latest reports from the isthmus of Darien, a new route for the canal has been discovered. It is only 22 miles long, and the deepest cutting will not be over 150 feet, perhaps not over 75 or 100.

The San Francisco *Bulletin* estimates the value of the yearly fruit crop of California at \$5,000,000.

Baltimore and Ohio Railroad.

MONTHLY MEETING OF THE BOARD OF DIRECTORS
—ELECTION OF A SECOND VICE-PRESIDENT—
BALTIMORE, PITTSBURG AND CHICAGO ROAD, ETC.

The regular monthly meeting of the Board of Directors of the Baltimore and Ohio Railroad Company took place yesterday at the office of the company, Camden Station, J. W. Garrett, President, in the chair.

After the transaction of the usual business, the President made the following remarks to the Board:

Gentlemen: The rapid increase of business, the necessity for taking charge of additional branches, and the expansion of the connections of the Baltimore and Ohio Company for some years past, have made the duties of the general officers exceedingly onerous. The Vice-President (Mr. King) has labored with great energy, ability and effectiveness as the assistant of the President, but the constant enlargement of the sphere of operations of the company causes, with the greatest diligence and thoroughness, the necessity for more aid.

In addition to the other palpable causes, the recent completion of the highly important Pittsburg, Washington and Baltimore road and the pressure for rapid movements to ensure the early construction of the Baltimore, Pittsburg and Chicago road, the great line from Pittsburg through Ohio, Indiana and Illinois to Chicago, imperatively require the appointment of an additional Vice-President. Under these circumstances the President was gratified to be able to state that Mr. William Keyser had assented to accept such a position. Although Mr. Keyser was quite a young man, being but thirty-five years of age, he had already achieved a reputation for superior business qualifications, for diligence, for integrity and appreciation of the interests of the public, which made it needless for the chair to express its judgment as to the value of the services which he would be able to render to the company and the community in the proposed position.

Great enthusiasm existed throughout the North-west to secure in the interests of those vast regions the advantages of the Pittsburg, Baltimore and Chicago line—as a grand competing route against the high charges and greater distances to New York—to Baltimore, their natural and most economical port on the Atlantic. Under the organization proposed, immediate and effective steps would be taken to decide upon the route, and secure the early construction of the road.

The chief engineer of the Pittsburg, Washington and Baltimore road (B. H. Latrobe, Esq.,) had recently submitted a report in regard to the various lines that had been proposed in the interests of the several sections which are pressing for the selection of their respective routes. This report is highly favorable as to the low cost and large advantages of several of the proposed lines.

As it will be the policy of the Baltimore and Ohio Company to make a large cash subscription to the stock of this road, and as it has been indicated that the remainder of the capital required could be promptly secured, the enterprise promised not only great advantages to the terminal cities and the intermediate and adjacent cities and territories, but the most remunerative financial results, especially in view of the very limited cost of the line when compared with the roads with which it would be brought into competition. It is therefore eminently judicious, in

every aspect of the enterprise, that arrangements should be perfected to secure the great fruits which will flow from the early completion of the work.

At the close of the President's remarks Mr. John Hopkins offered a resolution that the office of second Vice-President of the Baltimore and Ohio Company should be created, which was adopted. Mr. Hopkins then nominated Mr. Wm. Keyser to fill that office. This motion was seconded by Mr. Wm. W. Taylor, who expressed, from his intimate knowledge of Mr. K for many years, his confidence in his abilities, and his satisfaction that his services could be procured by the company. The nomination was then acted upon, and Mr. Keyser was elected by the unanimous vote of the Board.—*Balt. Sun.*

—We learn from the *Nashville Union and American* of the 7th inst. that the employees of the Alabama and Chattanooga Railroad, who were so rich only a few weeks ago that they felt justified in presenting to J. C. Stanton a seven thousand dollar silver service set, a few days ago struck for non-payment of back dues; that one of these employees for demanding his pay was beaten and bruised by Mr. Stanton and his son; that on account of these difficulties Mr. Stanton was arrested; that the creditors of the road have filed a petition forcing it into bankruptcy; that Mr. Crutchfield, an endorser of Mr. Stanton, will lose ninety thousand dollars by his confidence in the "great developer;" and that the Pennsylvania Central Railroad has leased the Alabama and Chattanooga to take effect from the 15th inst. Other rumors in connection with that road, not more encouraging than these find credit with intelligent men. The readers of the *Argus* will not be surprised at anything that may "turn up" in that quarter.

[This is just as we expected. Indeed, we learned over six weeks ago, when in New York, that the denouement would take place in less than sixty days.—*ED RECORD*]

HON. JAMES A. MCKENZIE.—It will be remembered that this gentleman was the leader in the Legislature in the interests of the opposition to the Cincinnati Southern Railroad. He was chairman of the railroad committee, and fought hard in the interests of the Louisville & Nashville Railroad. On his return home he became a candidate for the State Senate, but was badly beaten by Col. L. A. Sybert—McKenzie receiving only 15 votes to 64 for Sybert in the nominating convention. In the race for the Lower House, McKenzie only received 9 votes out of 79—H. C. Cooper receiving the nomination. Time makes all things even.—*Commonwealth.*

—*Chambers' Journal* gives this illustration of the power of India rubber to deaden sound: "We once visited a factory where some forty or fifty coppersmiths were at work in a shop above our heads; but what was remarkable, scarcely a sound of their hammering could be heard. On going up-stairs we saw the explanation. Each leg of every bench rested on a cushion made of India rubber cuttings. This completely deadened the sound."

—There are in the State of New York 133 savings banks, with assets amounting to \$220,000,000.

The Chesapeake and Ohio Railroad.

The response of the West to the prospect of this road connecting the Ohio with the Atlantic, has induced the Chesapeake and Ohio Directors to put forth every effort for the early completion of the extension. There are now six thousand men at work on a length of two hundred miles of road; which, we presume, is a specimen of activity in building unequaled in the history of railroad construction in the United States, and indicates the eagerness of the managers to avail themselves of the advantages awaiting the completion of the road. We learn that iron has been forwarded to both ends of the extension and that track-laying will be begun immediately. On some parts of the line cutting and tunneling has to be done, and at those points progress is limited by the possibilities of engineering; but there appears to be no doubt that, in a few months, this great trunk connection between the West and the Atlantic will be open through its whole length.

The completion of this road may be expected to create a quick development of the coal and iron resources of West Virginia. It has long been known that the coal deposits of that section were amongst the largest in the world, being thrice the extent of those of England; but so long as there was no railroad to convey the coal cheaply to market, this immense source of wealth remained untouched. The same remark is applicable to the iron deposits. We are not surprised, therefore, to learn that practical miners from Pennsylvania and Maryland are making active inquiry respecting mineral lands on the line of the road in anticipation of its early completion. Great credit is due to the capitalists conducting this enterprise for the energy with which they are pressing the much needed work to a quick consummation.—*New York Bulletin.*

RAILWAYS IN TEXAS.—The energy with which railways are now being constructed in the South-west is strikingly exemplified in the success which thus far has attended the building and extension of the road now known as the Houston and Texas Central. This corporation upon the completion of their line will own and operate 465 miles of road.

There are two divisions, known as the northern and western. The northern is being constructed from the city of Houston southward to Preston, on the Red river, a distance of 350 miles, of which 170 miles, to Groesbeck, are now built and equipped, and upon which the company are running daily trains.

The western division is to extend from Austin, the capital, to Hempstead, a distance of 115 miles, and of this section 60 miles is completed and running. The company have thus 230 miles in actual operation, leaving 235 miles yet to be constructed.

The earnings of the road in 1868 were above \$1,000,000 in gold, the company then operating 141 miles. In 1870, operating 166 miles, the earnings, also in gold, exceeded \$4,500,000; and thus far in the present year the earnings are considerably in excess of those of previous years. The Houston and Texas Central are endowed with an almost royal grant of land, which is also mortgaged to the bond holders to the extent of \$6,400 per mile; and as the company issue their bonds at but \$20,000 to the mile, they can not but be regarded as an absolutely safe trust, and are issued only upon road thoroughly built, equipped and in active operation.

A Cheap Railroad for Light Traffic.

Our ordinary railroads are far too costly for our farming country, and what is needed is something of a railway far less expensive in construction and management—something which shall combine the carrying capacity of the railroad with the cheapness of the common country road. Can this capacity and economy be combined? Can the farming country have a system of railway which it can practically control and operate for its own advantage?

Will not a single-rail tramway, laid and used as described, meet this requirement, especially for the farming country of Illinois, Indiana and Ohio?

The single-rail tramway is no untried novelty; it has been successfully operated with animal and steam power. In August, 1868, a single-rail line was constructed by M. J. Larmanjat, and according to the *Annales Industrielles*, a 3 ton engine drew over it two wagons up a long gradient of 1 in 14 and round curves of 16 feet 5 inches radius. Several lines have since been constructed in Portugal, and recent accounts speak of their satisfactory introduction in the thinly populated portions of India. In India they are operated by animal power on gradients of 1 in 40.

To meet the requirements of our farming country, I would propose the following single-rail tramway, which is substantially the Larmanjat system adapted to our wants and requirements.

The bed of an ordinary country road is taken, and on this road-bed are laid—as on a railroad—cross-ties, say 4 feet long, 5 x 7 inches, at the distance of 2 feet 6 inches apart from center to center, and upon these cross-ties a single rail of U pattern is laid, of the weight, say, of 25 lbs. to the running yard. If the country road-bed be firm, this will constitute all of the permanent way. If not firm, the portion of the country road traversed by the side wheels must be made firm. To accomplish this, various materials would be used. If wood were abundant, longitudinal sleepers would be put down; these timbers to be regulated by the traffic of the road and the tractive power employed. Limestone would be used, or any of the slates or sandstones, refuse and cinders from furnaces, and waste from coal mines, shells and gravel, or any material which would give a firm bearing to the outside wheels.

The carriages or wagons have four wheels, similar to the ordinary car or farm wagon, and in addition have two grooved wheels, which rest and run on and along the single rail described. These wheels are so adjusted by springs that the chief weight of the wagon is upon the central rail, without removing the outside wheels from the roadway, as the outside wheels serve to steady the car or wagon. The engines employed have the same wheels as the cars or wagons—the driving wheels resting on the ordinary road-bed, and with them the central rail serves principally as a guide rail. Increased adhesion is gained for the engine, and tractive resistance is lessened in the car or wagon. Larmanjat uses two engines. One class, weighing 10 tons, is capable of drawing a load of 50 tons up an incline of 1 in 50, at a speed of 6 miles per hour; the second class, of 5 tons, capable of drawing a load of 35 tons up an incline of 1 in 50 at a speed of 10 or 11 miles per hour, or, by changing the speed, of hauling the same load up a gradient of 1 in 20.

These results seem perfectly satisfactory, and meet fully the requirements of our farming country.

As an estimate of the cost of one mile of line of single-rail tramway, laid as described, I would submit the following:

25 lb. rail, with cross-ties, spikes, joint fastenings, track-laying, sidings, and ballast for rail, with country road-bed sufficiently firm for the outside wheels, \$2,800.

When road-bed is not sufficiently firm, and stone, cinders, gravel or other material are employed, say \$3,300.

When road-bed is not sufficiently firm and timber is employed, say \$3,600.

These estimates would necessarily vary in different sections.

The rolling stock for the Larmanjat system is admirably adapted for the service. As an improvement upon the system, and as an economy required by our farming interest, I would propose that the "box car" and "gondola" be substituted by the farm wagon, so that every farmer would have and own his own rolling stock. This is the fruitful source of expense and delay in the present system.

Every farmer has a good broad-wheeled farm wagon, and under the single-rail system this farm wagon may be made to serve the part of rolling stock. By this system every farmer would have a branch line running into his barn, and with his own line and switch, rolling stock and tractive power, he would be independent of the delays and changes incident to our costly system of railroads.

W. N. BOLLING,

Engineer Balt. & Ohio R. R.

—Cor. R. R. Gazette.

English Law—Prevention of Self-Risks.

The English have a very sensible statute which we think might well be enacted in this country. In that country a man must not jump on or off a train while it is in motion; if he does, he is hauled before a magistrate and fined. The penalties are not merely nominal, they are actually inflicted.

In this country, among other inalienable rights Americans exult in, is that of risking one's own life and limb at pleasure. He may scramble on or leap off a train under furious headway, or make the most fearful jumps after a departing boat, or off one of our moving bridges, for instance, and it is nobody's matter but his own, unless he happens to be injured, in which case he rushes for a lawyer to see whether he can make a railway or other company respond in damages for his bruises. But it never occurs to him that he hasn't a complete and unalterable right to risk being reduced to mince meat under the cruel motors of the iron horse, or to anchor himself in the filth of Chicago river. Without stopping now to discuss this point—which, however, upon the broad ground of public policy alone we deny most emphatically—we learn from the English journals that the law punishing the rashness of passengers has a most excellent effect. Salutary Englishmen pause before they risk, not only physical consequences, but a possible detention in a lockup over night and a vexatious interview with a magistrate next morning. The few seconds of time saved may be more than compensated by detention in durance vile, to say nothing of the fine—which may be a heavy one.

While we do not believe in the policy of "governing too much," and would interpose the fewest possible restrictions upon the free

movements of passengers on railways, etc., we are of opinion that some restriction and punishment of the reckless temerity of hurrying, restless, impatient Americans who so often expose themselves in the way alluded to, would be a salutary measure. The English system may be objectionable, theoretically, to the high-pressure notions of Young America, but we believe an ounce of legal prevention would be well worth more than the proverbial "pound of cure" in such cases.—*Chicago Review*.

NARROW GAUGE RAILROADS—Several narrow gauge railroads are projected in Pennsylvania. A company has been chartered to build a road of thirty inch gauge from Philadelphia, to connect with the Pennsylvania Central in Chester county, passing through Upper Darby, Hereford, Maple, Newtown and Paoli. In a week or two work will be begun on another narrow gauge road from Bell's Mills Station on the Pennsylvania Central, in Blair county, across the Allegheny mountains through Bell's Gap, a distance of twelve miles, which will afford an outlet for the coal, lumber and iron of an important mountain district. Some of the gradients on this line will be over one hundred feet to the mile. The Lancaster and Reading Narrow Gauge Railroad Company has been incorporated, with the right to build a road with a gauge not exceeding four feet, from the city of Lancaster to the city of Reading; also to construct branches. There is also a movement on foot to build a narrow gauge road from Media to Chester, in Delaware county.

CHANGE OF MANAGEMENT—At a recent meeting held in this city of the Board of Directors of the Cincinnati & Indianapolis Junction Railroad, Lewis Worthington, for some years past President of the line, tendered his resignation, which was accepted, and James A. Frazer elected to the position. James H. Sheldon, who for several years occupied the position of General Superintendent, the patrons of the line will be glad to learn, has been re-elected to that important position, vice E. L. Wentz, resigned.

Friction matches were introduced into Boston about the year 1836. In those times there were thirteen matches on a card and eight cards in a bunch, while now there are but twelve on a card, the number of cards composing a bunch being the same. In 1842 one firm in Boston manufactured daily about one hundred gross, which was then considered a very extensive business. Now this same firm are turning out on an average one thousand gross, or 14,400,000 matches daily, which requires a yearly consumption of 10,000 cords of sapling pine wood to make them, and the use of 600 to 800 barrels of brimstone, as well as from 40 to 50 tons of paper for putting them up preparatory for the market. They are also put up extensively in boxes for the Southern trade and export. Originally the old lucifer match was used, which was ignited by drawing it through sand paper; but they soon went out of use with the introduction of friction, and what was once considered to be chances about the household has now become a necessity.

The total number of hogs packed in Cincinnati this season, as reported in the Price Current, is 498,000, against 317,000 last year.

Railroad Items.

—It is proposed to lay down a cast-iron tube for railway purposes between England and France. The tube would be commenced at one side of the channel, and laid at the bottom of the sea, being built up inside a horizontal cylinder or bell, to be constantly pushed forward as the building of the tube proceeded. The line selected for the tube to be thus submerged is close to Dover on the English side of the Channel, and would extend to Cape Grisnez on the French coast, the distance between the two points being twenty-two miles, and the average depth of water one hundred and ten feet. According to this plan, the tube would be made large enough for the passage of railway carriages of ordinary construction, whilst the traffic could be worked by pneumatic pressure, thus securing a constant supply of pure air, and at the same time precluding the possibility of a collision. It is estimated that a slow train will be able to accomplish the distance in one hour and six minutes, but an express train in forty-six minutes. Five thousand passengers and ten thousand tons of goods could be conveyed through the tube daily.

—The exports of rails from Belgium in 1870 amounted to 122,926 tons, against 136,186 tons in 1869, showing a decline last year of 13,260 tons. A falling off of about 15,200 tons occurred last year in the exports of Belgian rails to Russia. The exports to Italy also declined 9,000 tons; those to Turkey, 12,000 tons; those to England, 2,000 tons, and those to the Low Countries, 800 tons. On the other hand, the exports to the Zollverein increased nearly 20,000 tons last year; those to France also increased 2,400 tons; those to Sweden and Norway, 1,000 tons; those to Spain, 3,700 tons, and those to Egypt, 1,000 tons last year.

—The Iowa Narrow-Gauge Railway Company, incorporated on the 21st ult., has its office in Marshalltown, an organized capital of \$2,000,000, and purpose to construct these roads from Marshalltown; one north-west to Webster city, 60 miles; one south-west to Des Moines, 55 miles, and one south-west to Waterloo, 50 miles.

—The magnificent double decked railroad bridge of the Circular Railway, where it crosses the Seine a mile below the Champs de Mars, has been knocked to pieces by the tremendous marine gun batteries of the Versailles government on the slopes of Montreuil, firing at the rate of 80 shots a minute.

—A narrow-gauge railway is projected from Memphis to Jackson, with fair prospects of early construction. The *Appeal* says the Iuka gravel turnpike costs \$12,000 per mile, and that the narrow gauge railroad will cost less and will pay twenty-five per cent. profit on its cost.

—The Alsatian railways pass into the hands of the German empire, in consideration of the reduction of the sum total of the war indemnity, by an amount equal to \$65,000,000. The acquisition of the Thionville-Luxembourg line is also provided for in the new treaty of Frankfurt, by which Germany receives immediately \$900,000,000 of French bonds, payable within a year, endorsed by French and German bankers, and convertible into consols or stocks at the option of the German party. \$100,000,000 of the bonds have been taken by Rothschild and Erlanger in France, and Hahn in Germany. The forts east and north of Paris are to be at once

evacuated by the German troops, Belfort, Longwy and Nancy held as hostages, and all French prisoners in Germany sent home by rail.

—The product of ingot copper in the Lake Superior district, from 1845 to 1870 inclusive, has been 113,386 tons, valued at \$63-357,240. The product of 1870 was 12,946 tons, valued at \$5,696,240, the largest of any previous year, though half the quantity in 1864 brought \$6,110,000. The total amount of pig iron produced in the Lake Superior region from 1858 to 1870 inclusive, was 239,160 tons, valued at \$27,799,809, of which 47,848 tons, valued at \$5,339,804, was the product of 1870.

—The gold deposits at the United States Mint for the month of March were \$325,542 61, and the silver deposits and purchases \$303,234 51—making a total of \$628,877 12. The gold coinage was \$550,245, of the several sizes, besides \$20,458 06 in fine bars. The silver coinage, mostly in dollars and half dollars, was \$146,549. The nickel coinage, three and five cent pieces, was \$7,400, and of bronze one and two cent pieces \$14,400. The whole number of pieces coined during the month was \$1,665,245, of the value of \$743,645 72, including the gold and silver fine bars.

7-30 GOLD LOAN

OF THE Northern Pacific Railroad RAPID PROGRESS OF THE WORK.

The building of the Northern Pacific Railroad, (begun July last), is being pushed forward with great energy from both extremities of the line. Several thousand men are employed in Minnesota and on the Pacific coast. The grade is nearly completed 264 miles westward from Lake Superior; trains are running over 130 miles of finished road, and track laying is rapidly progressing toward the eastern border of Dakota. Including its purchase of the St. Paul & Pacific Road, the Northern Pacific Company now has 413 miles of completed road, and by September next this will be increased to at least 560.

A Good Investment. Jay Cooke & Co. are now selling, and unhesitatingly recommend as a profitable and perfectly safe investment, the First Mortgage Land Grant Gold Bonds of the Northern Pacific Railroad Company. They have 30 years to run, bear Seven and Three-Tenths per cent. gold interest (more than 8 per cent. currency) and are secured by first and only mortgage on the ENTIRE ROAD AND ITS EQUIPMENTS, and also, as fast as the Road is completed on.

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Sinking Fund. The proceeds of all sales of Lands are required to be devoted to the purchase and cancellation of the First Mortgage Bonds of the Company. The Land Grant of the Road exceeds Fifty Million Acres. This immense Sinking Fund will undoubtedly cancel the principal of the Company's bonded debt before it falls due. With their ample security and high rate of interest, there is no investment accessible to the people, which is more PROFITABLE OR SAFE.

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WRIGHTSON & CO., Prop'r's

Chesapeake & Ohio Railroad.

In our number of the 18th inst., we spoke of the necessity of connecting Cincinnati with the Chesapeake & Ohio road. At the present time it is not evident that the Southern road (as planned and intended in this city) will be made. We hope for the best; and it may be that Kentucky, or the National Government, will at last permit Cincinnati to construct a national highway south. In the meantime, however, we ought to make something certain. We ought to have some highway to the southern Atlantic. Here we may say, that it is much more important to have a direct railroad to the south-eastern Atlantic than it is to have one to the south-west or the gulf; for, to the south-west we have the Mississippi river and its tributaries, but to the southern Atlantic we have nothing. If we make a great trunk line to the south-west, we shall do well, for in that vast country everything is progressing with great rapidity, and we need all the railroads we can get; but it is our own field now. It is not a new field, which we might conquer. The last is what Cincinnati needs. She needs new fields and markets for her manufactures. This she can get on the southern Atlantic, but will not get till there is a direct railroad there. From the capes of Delaware to the Savannah river, the whole country on the Atlantic is supplied with manufactures from New York and Boston. This is done partly by interior railroads, but far more by the coastwise trade, through small vessels and cheap carriage. Even flour, pork, cheese,

&c., which come from the west, are carried to the southern Atlantic towns in that way. But there are many articles of manufacture, especially those of wood and iron, which can be and are made cheaper in Cincinnati than in any eastern towns. There, with the immediate and great export of provisions, would at once create an immense traffic with the southern Atlantic. Let us take a view of this matter in connection with the idea of a Southern road.

The original plan of a southern road was to make a trunk line from Cincinnati to Charleston, through Knoxville. A pretty direct line would not have been over 540 miles. Through the Blue Ridge road constructing through South Carolina (and the Rabun gap, Georgia), the road may reach 700 miles. From Cincinnati to Charleston would not have taken over 28 hours of time, the same with that to New York. The result would have been that Cincinnati would have supplied the whole south-eastern Atlantic with what it wanted, and the trade of Cincinnati been nearly doubled. If the road were now made, through Chattanooga, it would be substantially a road to the south-west, not the southern Atlantic, and would not be as valuable by any means as the road to Charleston. But, as the matter now stands, we may not get either, and let us examine how far the Chesapeake & Ohio may supply that want. If we can not get a whole loaf, we may get half a loaf of very good bread.

Let us now take up the map of the United States and see how the land lies. Let us take a straight line to Charleston as the axial or standard line (which it really is) of what Cincinnati needs. Then draw a straight line through Chattanooga, which goes nearly to Pensacola. Then draw another to Richmond (or Newport News), which is the Chesapeake & Ohio route. The reader will probably be astonished to find that the line to Chattanooga is as far to the west as the Chesapeake & Ohio is to the east; in one word, that the Chesapeake & Ohio will be as useful and valuable a line, in reaching the heart of the South, as the line through Chattanooga. The line through Chattanooga is really a line to the South-west. If it would reach the Carolinas or Virginia it must do it wholly through lateral lines. In this respect the Chesapeake & Ohio will have decidedly the advantage. It will be quite as much a southern road as one through Chattanooga and Alabama.

Let us now look at some of the advantages of the Chesapeake & Ohio in regard to the local interests of Cincinnati. It is true that the trade of the Kanawha valley is considered as belonging to Cincinnati. But how? Only by the Kanawha river, and the narrow bottom of the Ohio. But experience has proved that the Kanawha is not reliable but a small portion of the year for any large traffic. The result of this has already proved disastrous, and seriously retarded the growth of the country.

A company of gentlemen owned a large tract of very rich coal beds on the Kanawha. They applied to a practical man to superintend the coal works, on the idea of shipping coal to Cincinnati. He examined the matter and refused to engage in it, on the sole ground that in consequence of the irregular navigation of the Kanawha, the men could not be kept steadily at work, and thus make it profitable. Otherwise it would have been a profitable business. Leaving coal out of view, it is very obvious that it is only by a railroad that the Kanawha valley and south western Virginia can be developed; and it is only by opening up and settling that vast tract of land south-east of Cincinnati, in Virginia, Tennessee, North and South Carolina, that Cincinnati can receive new and increased trade from the region which is naturally her own field. But if we suppose the Chesapeake & Ohio to be made, the good effect will be only partial, if the road stops at the Ohio river; for there must be two transshipments in getting on and off the river, and it is these transshipments which make a great part of the cost of freight. But there is a danger ahead which it is quite surprising the business men of Cincinnati do not see and take measures to prevent. The Big Sandy road is now making from Big Sandy to Lexington. At Big Sandy it will connect with the Chesapeake & Ohio, and at Lexington with Louisville. What is the result if Cincinnati does not make her connection? Why, that there will be a complete cut-off from Cincinnati! Trade will cross Kentucky and go to St. Louis and the west. Can it be that Cincinnati will suffer this? If she does, it will be the most unaccountable fatuity; and go far to show that she is willing to take the place of Amsterdam, calmly repusing on what she is.

At Richmond, railroad connections are made with Norfolk, Weldon, Danville, Raleigh, Newbern, Wilmington, Greenboro, Fayetteville, Charleston, Columbia, Augusta and Savannah. Thus the entire southern Atlantic will be reached by the Chesapeake & Ohio road, and every kind of manufactures, grain and provisions be sent, in short time and at cheap rates, provided the Chesapeake & Ohio really terminates in Cincinnati. This it will do, if the citizens of Cincinnati have any public spirit, or any wish to advance the interests of the city.

From Cincinnati to the Ohio terminus of the Chesapeake & Ohio is about 120 miles. The grading will be moderately good, and may be made very easy except in the hills of the Scioto, where it will not be high. To make this work there is the wealth and energy of Cincinnati, Portsmouth and four counties. Surely it can not be very difficult to accomplish, if the people really have any desire to. Let some spirited citizens come forward and set the ball a rolling, and it will soon be done.

Kentucky & Great Eastern Railway.

Pursuant to a call, the stockholders of the Kentucky & Great Eastern Railway met on the first day of June, and organized the company by the election of the following board of directors: W. P. Cutler, Gen. J. C. Fremont, of New York, James T. Brady, Esq., of Pennsylvania, Gen. N. P. Banks, of Massachusetts, Col. S. W. Morton, of Kentucky, A. J. Hodder, Esq., of Ohio, and Dr. John M. Duke, of Kentucky.

At a subsequent meeting of the board, Col. S. W. Morton was elected President, James T. Brady, of Pittsburg, Treasurer, and T. Wrightson, of Kentucky, Secretary.

J. H. POTTER.

It is with more than ordinary regret that we are compelled to announce the death of this widely known and most worthy gentleman.

When he was with us a few weeks ago, we saw in him the evidences of failing health, but we little thought he would be stricken down so soon.

Mr. Potter was well known among railroad men, particularly in the West, and was most highly esteemed, as a man of courteous address, sociable, generous, and the very soul of honor.

He was cut down in the very blossom of his life, when he was full of hope, experience and capabilities. His loss will be mourned by a host of friends, all of whom sympathize deeply with his bereaved wife and child.

Mr. Potter was an honored member of high degree in the Masonic fraternity, and will be buried by the Knights Templar of this city, on Friday next, at 10 o'clock, A. M.

CINCINNATI, RICHMOND & CHICAGO RAILROAD—ANNUAL ELECTION OF DIRECTORS AND OFFICERS—Day before yesterday the annual meeting of the stockholders of the Cincinnati, Richmond & Chicago Railroad (the line formerly known as the Eaton, Hamilton & Richmond road), took place at Hamilton. The annual reports of the officers were presented, and showed that the road is doing a satisfactory business. Following this the election took place, and resulted in the choice of the following named gentlemen as directors: D. McLaren, George F. Stedman, Lowell Fletcher, William Goodman, H. D. Huntington, S. S. L'Hommedien, E. W. McGuire, Charles W. West, F. H. Short.

Subsequently the usual organization of the board was effected, and the following officers were chosen for the ensuing year: D. McLaren, President; Geo. F. Stedman, Vice President; F. H. Short, Secretary and Treasurer.

The navigable portion of the Missouri river amounts in all to 3,150 miles. The channel varies from 300 to 500 yards, except at low water, when it is from 600 to 700 feet. The river and tributaries drain 518,000 square miles.

Chesapeake & Ohio Railroad—What shall we do?

We are glad our powerful daily cotemporaries are awakening to the importance of this scheme.

We have been pondering upon it for the last two years, with some good effect it is true, but not half that ought to have been accomplished.

The time is certainly at hand when we must do something, or this prize will slip from our grasp never to return.

A few days ago it was announced from Lexington that "all the money necessary for building the Lexington & Big Sandy Railroad had been subscribed. Responsible men, representing the Chesapeake & Ohio Railroad, have taken \$2,600,000, and the contract is signed. Work will commence immediately." This settles the fact of a railroad from the Big Sandy through Lexington to Louisville. Suppose, then, Cincinnati does not make a connection with the Chesapeake & Ohio, where is our connection with the southern Atlantic?

This is a case almost too plain even for comment. If we neglect to continue the Chesapeake & Ohio to Cincinnati we shall simply put Louisville just where Cincinnati should be. We voluntarily give up our advantages. We say to ourselves: "We are established. We want nothing new. It is enough to be like Amsterdam." "There," said a merchant to an American, "no man builds a house with any expectation of its being worth cost. He only builds for the use of his family." Cincinnati heretofore has been the very opposite of this. It has been full of enterprise, and rejoiced in rapid improvement. Shall all this stop?

The men who have contracted for the Lexington & Big Sandy road are experienced and responsible contractors, but they are not specially representing the Chesapeake & Ohio road. The basis of capital is furnished by the subscriptions of Lexington and the counties through which the road will pass. This is just what must be done at Cincinnati if the work is done at all. The Chamber of Commerce and the Board of Trade represent the commercial and manufacturing interests of Cincinnati, and should take initial proceedings in this matter.

Since we last wrote upon this subject, we see that the Chamber of Commerce has appointed a committee to have a survey made by the way of Fayetteville, Hillsboro and Picketon. The route is a good one, and on the eastern end a good deal of grading has already been done. If the river route be not adopted, the Hillsboro will be as good as any, especially with reference to the upper iron region. Leaving the question of routes open to competition, we may find it interesting to look upon the map and see what may be done.

The straight line—although impossible to make without very great expense—is, notwithstanding, the one by which we must estimate variation and cost. A straight line from Cincinnati to the mouth of Symmes creek, which is understood to be the point of termination of the Chesapeake & Ohio road, passes near Georgetown (Brown county), Aberdeen, and much south of Portsmouth, where the river makes a northern bend. The Picketon route would on an average be twenty-five miles north of this. But on the Picketon route there is a portion of the road already graded. Again, a variation of these routes is that

through the county seats—Portsmouth, West Union, Georgetown and Batavia. The last line and the river line would coincide near Georgetown.

One of the interesting problems connected with either route is, where will this road enter Cincinnati? Shall it attempt to enter at the foot of the hills, through Columbia and Fulton, or shall it pass round on the north, perhaps entering a tunnel? When the Marietta road was first surveyed, the best route was found to come down by Milford; but by some reason (probably the entrance through Symmes creek), the road was made where it is. The want of the tunnel is compelling vast expense and confusion attending the attempts to crowd everything into Mill creek and Deer creek valleys.

This again brings up the fact that Indianapolis, Chicago and Cleveland have grand union depots, into which all roads run, and whence a distribution of passengers and traffic can be easily made. Is it impossible to have such a depot at Cincinnati?

We speak of the different routes with only a desire to lay the facts before our readers. There is room for much competition, and we hope that competition may give zeal, energy and vitality to this enterprise, in which we think Cincinnati has a great and enduring interest. We are glad to notice recent indications that the friends of the river route are waking up and proceeding with energy. It is not unlikely that this route will be able to present the best show in regard to engineering. The grades must, of course, be low, and the country productive. There are now four different routes surveyed, or surveying, viz: The direct route to Portsmouth, surveyed last year; Hillsboro and Picketon route, also surveyed; the Fayetteville route, just undertaken by the Chamber of Commerce, and the river route, now surveying.

We have, therefore, an evident zeal awakened, and we trust that the public spirited citizens of Cincinnati will not let this subject rest till the Cincinnati road to the south-eastern Atlantic is made certain. Nothing can be more for the interests of this city, nor, we may add, of the whole of southern Ohio. The Kanawha valley will receive new life. The great iron region will have a great artery leading to this city. The river counties will receive new energy and soon double their population. From all this, even if we did not look south of the mountains, this city would receive a new impetus, and every dollar expended in that work would be returned tenfold. We are quite confident that if the business men of Cincinnati were to give this subject a careful examination they would do all in their power to favor this great work.—*Chronicle & Times*.

THE ROCKPORT & CINCINNATI RAILROAD—GROUND BROKEN.—The work of surveying the Rockport & Cincinnati Railroad is rapidly progressing. Two surveying parties are in the field, and three routes are receiving their attention. While all the proposed lines make Jasper a point, they strike the Ohio & Mississippi Railroad at three different places—Loggootee, Shoals and Mitchell respectively. It is believed the surveys necessary to locate the route will be completed within three weeks.

The first ground was broken in Harrison township, Dubois county, on Wednesday of this week, at fifteen minutes after one o'clock, this part of the line having been located.

Ninety-six paper mills in this country were destroyed by fire during last year.

The Chesapeake & Cincinnati Railroad.

RIPLEY, O., May 24.

To the Editor of the Cincinnati Gazette:

There is a communication in the Daily Gazette of the 11th inst., from the pen of "E. D. M.," in regard to the Chesapeake & Ohio Railroad and its connections, in which the writer says:

"A line from Cincinnati on the Ohio side, via Portsmouth to the mouth of Symmes creek, which is about the terminus of the Chesapeake & Ohio. To make this line a company was formed, which took out certificate February 1st, 1870. The capital stock is \$1,000,000, and the line of the road was stated to be by Ironton, Portsmouth, Aberdeen, Ripley, Higginsport and New Richmond. This is the river line, and would have one great point in its favor; that it would unquestionably be profitable and ought to tempt capitalists to embark in it. It would stand to Cincinnati just as the Hudson river does to New York. We have heard nothing further being done with it."

What E. D. M. says as to the business on this route is beyond all question true. The population accessible to the road on the river line, including both sides (Ohio and Kentucky,) between Cincinnati and Portsmouth, and not including either of those cities, would number one hundred and thirty thousand, while on what he calls the interior line, or a modification of the river line, via Batavia, Georgetown and West Union, the population would be sparse, not exceeding twenty-five thousand.

On the 3d inst. a corps of engineers commenced a survey of the line along the Ohio river at Portsmouth. They reached Ripley to-day, and in a few days more the survey will be completed, and when completed will show that the river route is where the connecting link between Cincinnati and the present terminus of the Chesapeake & Ohio road should be made. This will be found true not only as to the local business, but still more so when distance, grades, &c., are considered. With this corps of surveyors are three of the Chesapeake & Ohio Railroad Company's engineers—Colonel Pryor one of them—and they are making a complete and thorough job. In no place has the grade exceeded 15 feet to the mile, thus far, and generally it is not over seven. It will continue the same to Cincinnati. The curves are gentle, and in many places there are stretches of five and ten miles perfectly straight. As one of the engineers expressed it, "it will be like building a road across a prairie." On such a road a high rate of speed may be attained, and a single locomotive will draw all the cars you can hitch on to it. S.

— The round figures of the railroad interest are easily learned and remembered. The whole length of all the railways in the world is 120,000 miles. The cost of the same was, in round numbers, ten billions of dollars. Those of Great Britain are the most costly, and those of the United States are the least so. The railway system of the world gives employment to over one million persons.

— The value of hooks imported by the United States during the year 1869 was £205,383; while the value of hooks exported to England was £10,277. The total value of exports to all countries was £676,459, and the total imports, £134,963.

The Ohio River Railroad.

A Madison (Ind.) correspondent of the Cincinnati Gazette, under date of May 26, says:

"Our city and county are becoming considerably interested in the construction of the Ohio River Railroad.

This road is to run from New Albany and Jeffersonville to Cincinnati, running up the north bank of the Ohio river, and connecting with the O. & M. road at Aurora, Ind.

The company was organized about a month ago, and have been moving in the matter as if they meant business. A petition has been presented to the board of county commissioners, asking them to appoint a time for holding an election to determine whether our county should take stock in the road or not, and the commissioners have ordered one for next month, and the question is, Shall our county take \$150,000 stock in the company?

Meetings have been called in every township, and are to be addressed by our own public spirited citizens, who feel the need of such an improvement.

Our city will be a unit for the road, but, as a large part of our county is back from the river, and the road will run on one side of the county, there will be some opposition from the country.

We also understand the other counties through which the road will pass are beginning to take action in this enterprise, and favorable reports reach us from them, which give great encouragement to the directors, and make them confident of success.

The construction of this road will be of vast importance to our city and county, as we have but one road, and have to travel about twenty-five miles north to make connections either east or west. It will also be of no small importance to your city and the traveling public, as it will furnish a short route from New Orleans and Memphis to New York via Cincinnati, and also from the west.

A company are now building an air line road from New Albany to St. Louis, all of which is under contract, and the work is being pushed forward as rapidly as possible, a large portion of the work having already been performed. With this road completed, and the Ohio River road built, a competing line from Cincinnati to St. Louis and the west, with the O. & M. road, will be insured, which will reduce the rates of freight and travel.

The road will also give Cincinnati another route to Louisville and the south, in addition to her other two, the influence of which will be felt in the increased travel and commerce from Cincinnati to the south and west, and vice versa.

The immediate benefit to our community will be an increase of the value of their property, and direct communication with all important points east, west and south.

PROGRESS.

THE UNPAID WAR BILLS OF THE WORLD — Some industrious searcher into abstruse financial matters lumps up the unpaid war bills of the world as follows:

	In pounds.	In dollars.
Great Britain..	780,000,000	\$ 3,840,000,000
Cont. Europe..	2,165,430,000	10,394,064,000
America	765,320,000	5,673,536,000
Asia.....	104,716,000	502,636,000
Africa.....	39,655,000	100,314,000
Australasia....	35,744,000	171,571,200
Grand total..	£3,910,865,000	\$18,772,151,200

The Nesquehoming Tunnel.

It is not generally known that a tunnel which, for scientific engineering, and economy, speed and durability of work, is not surpassed by the Mont Cenis or Hoosac tunnels, is being driven by the Lehigh Coal & Navigation Company, of Pennsylvania. The location of the tunnel is near Summit Hill, Pa., and it is being driven for the purpose of doing away with the Switchback Railroad. It is a continuance of an old mining tunnel known as No. 7, and when completed will be nearly a mile in length. The company adopted the location as the most central and desirable, and the old tunnel having been driven 1,500 feet to the Mammoth Vein, made considerable less distance to be cut. Although little known by the public, engineers of celebrity state that the science of tunneling is here illustrated under the most perfect conditions, and that the record of the work is eagerly examined by experts, both here and in Europe. The work, to describe the whole of which would require too much space, was at the beginning prosecuted by hand drilling, but as soon as the Barleigh drills were introduced, they were adopted after trial, and went into operation March, 1870, since which time they have given great satisfaction. The tunnel is driven through the coal measures, cutting each vein known in the region, and after passing through them, it penetrates an intensely hard conglomerate, leaving which, it enters red shale.

A brief description of the Barleigh drills used will be interesting. The drills are driven by condensed air, which is pumped by six 20 horse power steam engines into a large iron receiving tank, from which it is conducted into the tunnel through a six inch pipe of cast iron, and is distributed by hose to the three carriages which support the drills. These three carriages support the drills used for the heading and the first and second enlargements. The heading carriage supports five drills, the first and second enlargements having each three. Motion is given to the drills by the action of condensed air in the cylinder, the piston of which is connected directly with the drill. Their working is far superior to that of any previous process, a three inch hole having been driven in sandstone in eleven minutes, while the average progress in the hard conglomerate rock is seven feet per hour. The heading is now in the red shale, and is proceeding at the rate of 35 feet per week.

Work is soon to be prosecuted from both ends of the tunnel, and the hoiler and blowing engines are erected and in readiness at the north portal. When under full headway, about 60 feet per week will be made, and at that rate the two headings will meet in September. The enlargements follow upon the heading, and it is expected that trains will run through by January, 1872. The work, when completed, will save great expense and delay in moving trains upon the Lehigh Navigation Company's roads, and will be quite as much an object of curiosity to tourists as was the famous Switchback Railroad, which has been visited by many thousands.—Iron Age.

— Kansas leads all the States in the average yield of corn, it being 48.4, followed by Nebraska with 42.2, and California 41.4. She also stands third in yield of wheat, barley, potatoes and hay, and seventh in buckwheat.

— Forty thousand tons of lead are imported into the United States every year.

Statement of the San Diego and Gila Southern Pacific and Atlantic Railroad Company.

The San Diego and Gila Railroad supplies the California section of the 32d parallel railroad line from the Mississippi river to the Pacific Ocean; and is projected to establish intercommunication between the valley of the Colorado river (and its branches) and the Pacific Ocean.

The western terminus is at the bay and harbor of San Diego, a safe and commodious roadstead; and the eastern terminus is at Fort Yuma, on the Colorado, and at the mouth of the Gila river; which lies directly eastward across the territory of Arizona for 350 miles, with several branches leading north and south, and drains a geographical area 400 miles long, east and west, and 200 miles wide, north and south.

The Bay of San Diego is 450 miles—45 hours south from San Francisco, and 2,780 miles—278 hours north from Panama, and is in the same latitude with the principle ports of China, Japan and Eastern Asia, and north of the Sandwich Islands.

San Diego is within 10 or 12 miles northwardly of the Pacific end of the United States and Mexican boundary line, which leads directly to the mouth of the Gila river, with a right line distance of 148.7 miles, the boundary line thus forming a directrix between the termini of the railroad.

Between the bay of San Diego and the Colorado river there are two grand physical geographical features—the Sierra Nevada mountains, and the Colorado desert.

The Sierra Nevada mountains rise contiguously from the Pacific coast to an elevation of some 4,000 feet, in a distance of 50 miles, and slope down to the Colorado desert, eastward, in about twenty miles further, to an elevation only a few hundred feet above the sea. The western slope of the mountains is diversified by a system of valleys, ravines and canons, connecting and rising like terraced plateaus one above another, while the eastern slope descends almost precipitately to the desert. The desert extends from the eastern foot of the mountains to the Colorado river, a distance of 80 miles, and is a flat, sandy, sterile plateau basin, with its depression scarcely 150 feet above the sea. Its only redeeming feature is the so-called New river, a drainage depression into which the overflow of the Colorado river, finds its way from a point some 20 miles south of Fort Yuma, discharging an immense volume of water into a yet lower basin of the desert some 50 miles north of the boundary. The New river valley is flooded to a width of ten miles (and often more) annually, and fertilizes the valley to the extent that good grass is found sufficient to graze herds of cattle, and to enable Indians to raise indifferent crops of corn, squashes, beans and melons.

A low range of sand hills, with Pilot Knob range of hills surmounting them, cuts the desert off from the Colorado river and forms its eastern rim, being some 10 or 12 miles in extent east and west. Their southern end just reaches to the boundary line. This range is usually spoken of as a part of the desert. The peculiar topographical features of the approaches and crossing of the Colorado river can not be described except by maps; and the bay of San Diego is best studied from the United States Coast Survey Chart.

Two routes have been surveyed for the railroad. The first in 1855, by C. H. Poole, C. E.,

followed the San Diego river to its head, and reached the summit of the mountains at Warner's Pass (which is 45 north of the boundary line,) at an elevation of 3,630 feet, and 64 miles from San Diego.

The descent to the desert was made in 46 miles to an elevation of 445 feet by a very crooked drainage valley—San Felipe and Vallecita.

The line bearing southeastwardly, would approach the boundary line at New river, near the middle of the desert, and thence lie near the boundary to Fort Yuma. This route is about 230 miles long, increasing the air-line distance by 54 per cent. Two subordinate summits were found on the mountain section, increasing the elevation to be overcome by 873 feet. The summit grades on the western slope vary from 96 feet per mile to 452½ feet per mile, averaging 158½ feet per mile for a distance of 14½ miles. The descent to the desert has natural grades of 175 feet per mile for three miles, 263 feet per mile for 2 miles, and 125 feet per mile for 5 miles.

A more direct line was surveyed in 1869, under the auspices of the Memphis, El Paso Railroad Company of Texas, by Col. Thomas S. Sedgwick, Civil Engineer.

This route leaves the bay by the Otay valley and follows it to its head at Riley's summit to an elevation of 1,500 feet at 33½ miles from New Town, descends to the San Ysidro canon, in 4 miles, 660 feet, and thence rises continuously to the summit of the mountains, at an elevation of 3,855 feet in 30½ miles; thence to the desert by a continuous descent in some 37 miles to an elevation of 500 feet; thence across the desert to Fort Yuma, a distance of 80 miles, (by estimation.) This route will be about 185 miles long. If this line were extended to the sea by Otay valley, it would be only 180 miles long, an increase of only 31 miles—or 21 per cent over the boundary line distance.

This line is remarkable as to general direction between its termini. A chain of valleys was found leading directly eastward from the bay to the head of Carizo canon (in which the line was laid for nearly eight miles) which, running nearly north, makes the only noticeable break in the general good direction of the line.

On the mountain section, the line approaches to within one mile of the boundary in Ticate valley, and at the leaving of Carizo Canon is 15 miles north of the boundary; indicating that the line may be laid in a belt of 15 miles in-width (adjoining the boundary) which can not be said of any known mountain line of equal length in the United States. The alignment is generally favorable to a first class road.

The gradients rising to Riley's summit will not exceed 90 feet per mile; descending to the Ysidro valley, a gradient of 100 feet per mile will obtain; and rising therefrom a gradient as high as 105, or probably 107 feet per mile for 6 miles. Thence to the summit of the mountains, 23 miles, the gradients will vary—being 80, 90 and 100 feet per mile in sections; while from the Walker's Pass summit down to the Carizo Canon, a direct line of 10½ miles will give a gradient of 110 feet per mile; while a more circuitous line, making the distance 15 miles, will give gradients of 90 feet per mile. Adown the Carizo Canon, and to the desert, the gradients do not exceed 90 feet per mile, as surveyed, while the desert portion is nearly level; and the Pilot Knob hills can be crossed or turned with light gradients.

The general character of the work indicates

a great cost of gradation on the mountain section, while the desert section is far below the average of even prairie roads.

Viaducts are indicated to a notable extent. That at San Ysidro Crossing will be from 2,000 to 2,500 feet long and 150 feet high; while the bridge at the Colorado river should be a clear span of 400 feet between bluff banks of granite.

The only tunnel *actually necessary* to be made is in getting out from the Cariz, Canon to the desert by boring through its rim, and will be less than 1,000 feet long; but more detailed surveys made show that two or three others might be adopted with good economy, depending upon the character of the road to be built.

The line will terminate at the best wharfage site on the Bay of San Diego, on the lands now owned by the company, and is adapted to economical and efficient extension to all desirable points on the bar.

This route is, at the least, 30 miles shorter than the Warner Pass route, and is no more expensive, mile per mile, and has more favorable gradients.

Good depot buildings and wharves will be needed at San Diego and buildings at Fort Yuma, but few station buildings on the line.

Water stations can be established on the desert, with wells 20 to 30 feet deep, and on the mountains by springs. A natural supply of fuel can not be obtained near the route and would need to be supplied at considerable expense.

The following approximate estimate of the cost of grading, masonry (very little) and bridging (almost entirely viaducts) is based on the hurried survey of the Trial Line, the preliminary location of seventeen miles, surveys made at Fort Yuma, and personal examinations. The road is estimated to cost \$22,500 per mile for gradation only; gradation and permanent way, \$35,000 per mile; and with wharves, depots, shops, and water stations and sidings, \$36,625 per mile, a total of \$6,775,500.

The mountain section of the road, 83 miles in length, equals a cost of \$37,410 per mile for gradation, and permanent way added, \$49,910 per mile, a heavy average; but the desert section of 85 miles averages but \$3,940 per mile for gradation, and \$21,440 with permanent way.


This estimate is based upon an economical adaptation of the roadway to the natural surface; and fairly represents the amount for which the road can be built.

The charter of the company provides for an issue of \$4,000,000 of capital stock, and the same amount of first mortgage bonds. The company has 8,500 acres of land available as assets, from which from \$1,000,000 to \$2,000,000 could be realized within five or six years. The establishment of this road would control an important trade with Arizona and New Mexico; not only with California, but with New York via Panama Railroad route, and steamships which now stop at San Diego en route from Panama to San Francisco; and would be an indispensable link in the 32d parallel railroad line.

THOMAS S. SEDGWICK, C. E.,

Chief Eng and Agt S. D. and G. R. R. Co.

New York, May 20, 1871.

 The great bell on Notre Dame, Montreal, is the largest but one in the world. It weighs over 10,500 pounds, and can be heard forty miles.

The Origin of Various Modern Appliances.

No more vivid impressions of the immense changes that material progress has wrought can be obtained, than will be furnished by a slight research into the origin of some of the usages and conveniences of the present day. For instance, the delicate purple and fine linen of the tasteful lady and gentleman of our day, are not, after all, so very far removed from the skins and hides in which our early ancestors were clothed, that we can not distinctly trace the steps by which the improvement of costume has been achieved. At this very day the dress of the North American Indian, where he clothes himself at all, fairly represents the *leathern* garb of the ancients, the existence of which the Latin word *sueri*, to sew; that taking the form of the noun *sutor* (the cobbler or *sewer* of *leather*.) sufficiently disclosed the fact that the latter had once been a tailor as well. The skins of animals were then the first material that human fingers sewed together after the expulsion from Eden.

The ancient Greeks and the earliest inhabitants of Italy got their ready-made clothing from the Syrian coast, for their words that designate the body-dress and upper mantle, viz: *chiton tunica*, are of Phœnician origin.

The spinning of linen, about which so much has been written, was a very ancient Egyptian handicraft, although the Greeks appear to have imported their linen from Phœnicia, since the words *chiton* and *kithon*, meaning linen, seem to agree with the Phœnician expressions *kitonel*, *ketonel*, signifying the same thing. But the Colchian and Sardinian linens were also celebrated. The early Gauls and Germanic tribes also had the art of spinning linen at a very early day. The word that designates it can, however, be found in all languages of Europe, from the Basque provinces of Spain to the land of the Magyars.

In the earliest day, the sails used on the Mediterranean were made of linen, but Tacitus tells us that the Suevi had no sails to their boats. Nevertheless, the Suevi were the ancestors of the Swedes and Norwegians, and the deduction is that they had sails no earlier than the appearance of the Romans in the North of Europe. This would give the nautical pre-eminence of the Scandinavians a comparatively recent date, and place them about in the position of the early Peruvians, whose coasters had no sails until the Spaniards came. However, the far-away ancient pile-buildings of Switzerland, the remains of whose towns and dwellings so far preceded modern history, prepared cloth from flax, and spinning shuttles, or something very similar to them, have been found among the mound relics of Denmark. We find, too, that Pliny tells us of traffic by sea between Norway and the Shetland Isles in his time, designating the former country by the word *Nerigon*, and the latter as *Thule*. How it could have been accomplished without the use of sails is not easy to make out.

Linen rags were first converted into paper in the 12th century, in Spain, but the idea was of Arabic origin.

Hemp, although unknown to the Greeks in the time of Herodotus, was, nevertheless, cultivated by the Scythians, who were also acquainted with the stimulating properties of the *hasheesh* seed. Hierap, of Syracuse, brought it from Rhodanus, and also from the country of the Celts. The most ancient Latin author who mentions it was Lucilius, who wrote about the year B. C. 100. The name *hemp* is found in all the European languages

nearly unaltered, starting with the old German word *hanaf*—in Latin formerly *caunabis*

The original use of some vegetables and spices is quite curious. Onions and garlic are of South European origin; the word *shalot*, in Italian, *scalogni*, reminds us that the city of Ascalon was once celebrated for its trade in young onions. The Israelites were great onion eaters in the days of Moses, for, as we find in Numbers, 11 chap., 5 v., they longed on the march through the wilderness for the onions of Egypt:—"We remember the fish we did eat in Egypt freely; the cucumbers and the melons, and the leeks and the onions and the garlic."

Cumin, in Hebrew *kamnon*, and in Latin *cuminum*, seems to have traveled from the Levant to Europe along with mustard, *napy* and *sinapy*, as the latter was called. The Romans got the original name from the Greeks. The modern word mustard, in Italian *nostarda*, and the French *moutarde*, is from the *must* or wine lees, with which it used to be mixed.

The lentils, for a mess of which Esau lost his birthright, gave its name to Phakussa, or the *City of Lentils*, in ancient Egypt. In the fifth century the word *phakos* lentils indicated an article of daily food in Athens. But the Romans got another expression, *lens* or *lendis*, from which our own is derived. Beans we trace back easily enough to the Homeric expression *erebin*—*thos* in Greek. Peas also find their origin in the Grecian *pisos*.

The use of that very serviceable creature the ass has quite a history. The Greeks imported him from Syria, although his earliest origin must be looked for in Africa. The crossing of his breed with the horse, Homer ascribes to the Paphlagonians. Bees were not known as a domesticated insect to the Greeks at the time of their fine old epic poems, for the *Iliad* mentions only the wild swarms. This is strange, since, when Livingstone the great African traveler penetrated the Southern recesses of the negro Continent, he found that the native tribes hived bees.

Our style of building, or at least the erection of stone houses, comes directly from the Romans, who were the pupils of the Greeks. The Celts preceded the Teutons in this art by several hundred years, for the latter lived in block houses until a comparatively recent period in modern history.

The investigation that discloses these special facts gives us thousand-fold testimony that the great bulk of culture and improvement has been concentrated within a comparatively small range of centuries, and speaks trumpet-tongued in honor of the wonderful activity of mind developed in the epoch now actually passing.—*Merchants' Journal*.

—Articles of association of the Brazil & Chicago company were filed with the Secretary of State of Indiana on the 1st inst. The road is to be built from Brazil, Clay county, to Chicago, and will pass through the counties of Clay, Parke, Fountain, Vermilion and Warren, in the State of Indiana. The total length of the road will be about 180 miles. The capital stock of the company is fixed at \$1,000,000.

—The ticking of the clock at the Cambridge Observatory can be heard in San Francisco. This is done by connecting the pendulum of the clock to the telegraphic wire in such a manner that the main circuit is broken and instantly closed again at every swing of the pendulum.

The Coal Trade—Interesting Facts and Figures.

The anthracite trade is now 2,733,004 tons behind last year. Last year we increased 1,716,690 tons over 1869. Had no suspension taken place, and the offer made by the coal operators and companies been accepted, the market this year would have taken from one and a half to two millions of tons increase at the low rates, which would have removed nearly all the surplus production from the markets, so that another year's increase would have absorbed the whole increase at better prices. As it is, there will be an increase of anthracite this year, and we may fall a little short of last year, and the whole increase will be made up from domestic and foreign bituminous coal, so that the anthracite trade will be in the same condition next year as regards its ability to overstock the market. All this is the result of the ill-advised suspension this year—and while it may pay a little better for the balance of the year, it would have been financially, and in all other respects, to the interest of all parties if it had not taken place, while it entails another year of difficulty and lower rates to overcome. Each one can calculate what he would have received in at least twelve weeks of full wages lost during the suspension, and how much he can make up of it in the twenty-eight weeks remaining of the year up to December 1, at a little higher wages during these twenty-eight weeks.

From the best information we can glean, there is a transporting capacity equal to 525,000 to 550,000 tons a week during the balance of the season. The whole supply of anthracite coal sent to market last year was 15,368,437 tons. We have already sent 1,762,418 tons to market, and for the remainder of the season we can send at least 480,000 tons on an average up to December, which would about bring it up to the supply of last year. If prices should rule at about \$4 50 put on board at Philadelphia, and say \$5 at the shipping ports at New York, we think the market will take about last year's supply; but if they should, from any cause whatever, run above these prices on an average, we doubt very much whether the market would take within half or three-fourths of a million of the quantity sent to market last year; and the balance would be made up entirely with bituminous coal, the increase of which already from all sources is at least 400,000 tons.

It is announced that a French chemist has succeeded in discovering a process for rectifying petroleum, by the addition of a small quantity of a certain chemical product (not named) to the liquid before distilling, by which means an oil is obtained without any odor, even when burning, and the point of inflammability of which is so low that it must be heated to 177 degrees before ignition occurs. The volatile gas, usually so readily disengaged from mineral oils, becomes so fixed that evaporation takes place, and consequently the danger of fire and explosion is reduced to the minimum. The oils thus prepared, it is stated, can be made into soap, or can be mixed with vegetable oils, and burned like colza in carcel lamps. The soap made by this new form of petroleum oil is said to be very efficacious in diseases of the skin; and it is also applicable to the destruction of insects. Articles washed with this are claimed to be ever afterward free from attacks by moths.

An Electric Railway Signal.

If benefits can ever be said to flow from disastrous railway accidents, they are most to be realized perhaps in the active stimulus thereby administered to the inventive genius of our mechanics and engineers. Devices, not only with especial reference to economy and—which is much the same—convenience in operating R's, but looking to the assured, absolute safety of persons and property carried, have been elaborated from time to time by inventors, to many of which inventions we have heretofore called the attention of our readers.

The theory of operating a line of railways with absolute safety might seem to assume and presuppose that all parts operated shall be so stable, so thoroughly well put together and so skillfully combined and managed, that danger is not to be supposed or taken as possible from any defects in any of these particulars. But in practice it turns out otherwise. Unforeseen circumstances will sometimes combine; and as they are beyond all human provision, so they are beyond all human power to avert in their consequences. And therefore, in all successful railway management these untoward circumstances are and must be taken into account. Danger must be taken to be omnipresent. Hence, on some European railways (and we believe in America also) the policy is adopted of never allowing a train to pass a bridge, a road crossing or a depot, until the engineer is assured that all is safe. He is to assume the contrary till he is informed positively! Under all circumstances the most careful and energetic measures must be adopted for the prevention of disasters. Not only ought the very best materials to be employed in constructing the very best appliances used in running trains, but among other things for giving early and infallible warning of the presence of danger. These remarks are suggested by noticing the trials in New York of a recent electric danger signal, of which we give the following brief description:


The system includes a series of devices by which, through the agency of electro-magnetism, an alarm signal is displayed and a bell rung whenever a switch-rail is out of place, a draw-bridge open, or a train approaching a road crossing. Inclosed in a box at the point of application to the main line, are several metallic rods connected by electrical conductors with a galvanic battery yielding constant currents whenever the circuit is completed. The conducting wires, carefully insulated, terminate at the signal-station in the cores of two electro magnets. An armature directly above the magnets acts by a lever upon a signal staff and the clapper of an alarm bell. So delicate is the adjustment of the rods at the point of application that the displacement of a rail on either side of the main line, or the withdrawal of a bolt that secures a drawbridge, or the passage of a train over the track, is sufficient to connect the poles of the battery and to complete the circuit. The flow of the current vitalizes the magnet at the signal station and the armature moves, ringing a bell and raising a colored signal. The bell rings and the signal is uplighted until the electric current has been broken by the readjustment of the rail or the replacement of the bolt of the bridge. The magnet may be acted upon at a distance of a few yards or many miles, so that an alarm may be sounded at any distance from the point of danger, and signals may be displayed in either direc-

tion at such distances as to allow the stoppage of a train.

The apparatus is the same in principle for every application. The applications are four in number—to switches, drawbridges and crossings, and in what is known as the "block" system. By an attachment to switch-rails, double warning is given to the eye of the engineer and to the ear of the switch-tender, whenever a switch is opened on the main line so as to endanger trains. In the case of drawbridges, alarm signals continue in operation until the draw is closed and the bolt replaced. By the block system, the wheels of a passing train come in contact with a series of delicate levers, at intervals of two miles on the main line, each of which closes an electric circuit, by means of which a signal is brought into sight two miles in advance of the train. At the same time, the pressure of the wheels upon another lever breaks the circuit, and the signal at the station falls by its own weight. This system, by which a train registers its position two miles in either direction, is designed to prevent collisions. In like manner, when a train is a mile and a half distant from a crossing, a bell may be rung and a signal displayed, by which teamsters will be given timely warning.

Two of these applications—the attachment to draw-bridges and switch-rails—have been practically tested on the Morris & Essex and the N. Y. & N. Haven lines. The apparatus is inexpensive, and requires no more attention in its operation than a single galvanic battery.

A WONDERFUL INVENTION.—We copy as follows from the N. Y. Times of a recent date, which can but excite a deep interest among manufacturers: "Abel's new combination loom, now on exhibition, is one of the most wonderful and beautiful of recent inventions. It occupies but one tenth the space of, and accomplishes ten times more work than any other loom. A boy can furnish enough power for several machines. The old needle is used, but the bobbins are so free from tension that delicate threads can be knit and woven into a fine strong cloth. The entire operation is viewed at a glance. The yarn passes direct from the bobbin. Knots are smoothly sheared, and fresh bobbins are supplied without any interruption. There is no dressing, beaming, spooling or warping; in fact the old method is entirely revolutionized. The machine makes twenty-five yards of cloth per hour. It takes its own warp or filling from the same bobbin as the weft threads. It weaves a cloth that can not be raveled, of jute, flax, wool, cotton and silk, and can produce fine blankets, strong carpets, wool sacks, gunny cloth, bagging, cotton, linen or silk textures—indeed, anything that can be woven or knit. The operation is more noiseless and beautiful than that of the sewing machine. The introduction of this invention into general use has already commenced, and it bids fair to greatly reduce the price of good and durable home made cloth. Many persons possessing small water and steam powers heretofore unavailable, will now be enabled successfully to compete with the larger manufacturers, who, by the old process, required much more power and room. No printed description can do full justice to this invention, which must be seen to be appreciated."

 The daily consumption of coal in New York city in winter is estimated at 20,000 tons.


The Value of Rice.

The American people have made the culture of rice so much of a study, and pursued its progress so scientifically, that our Carolina rice is acknowledged to be the best in the world. While growing, it is the most beautiful of all American husbandries, and can not fail to attract the attention of the most disinterested reader.

It is a very important article of food in its general usefulness. It is used for breads of various kinds, cakes, pies, custards, soups, gravies; also as a diet for invalids—as a medicine in relieving a disordered condition of the stomach and bowels; it is invaluable in the laundry, and is of great use in the manufactures, its paste being made into a variety of tasteful ornaments. All kinds of stock, from horses to pigs, are frequently fed on rice meal, the detritus of chaff and grain; it is a nutritious and fattening food.

The rough rice, or paddy, the favorite food of the rice bird, may be given to poultry; it contains so much silex in its rough husk, that while feeding on it they need no gravel for attrition in the gizzard. It is, therefore particularly suitable for poultry on a long voyage, or in places where there is no gravel in the soil. The chaff is in demand for packing glass or chinaware, and is also a perfect non-conductor of heat.

HOW TO BUILD UP OUR CITY.—Encourage men to come and locate with us, especially the worthy and active, whether they have capital or not. Those who have means will purchase lots, build manufactories and houses, and give employment to labor. Stimulate every legitimate enterprise by giving it proper encouragement, or by uniting our industry and capital in the cause. The importance of our people spending their money at home is great. There is not a quicker or surer way to build up a city than to foster and encourage home business. Home architects should plan our buildings, and home mechanics should work for us. Encourage our own manufacturers by purchasing what they make that we may need, and above all things our retail merchants should patronize the wholesale houses here. By this means all will be benefited and our city will grow. Such a course will enhance the value and demand for houses and land. Let every man cultivate a public spirit, and talk less than he works. Help our neighbor. If he is in danger of breaking down, prop him up in some way, instead of kicking him under—his talents and labor are worth money to the community. Encourage our citizens and local authorities in making public improvements, and stimulate every individual enterprise.—*Exchange.*

 The number of patents issued for the year 1870, inclusive of reissues and designs, was 13,321; number extended, 111; number expired during the year, 2,543; number of trade marks registered, 131. Of these, the number of patents issued to New York was 2,962; to Pennsylvania, 1,481; to Massachusetts, 1,448; to Ohio, 982; to Illinois, 835; to Indiana, 452; to Iowa, 208; to Wisconsin, 223; to Missouri, 210; to Minnesota, 70; to Michigan, 401; to California, 216; to Kansas, 46. The amount of receipts by the Patent Office for the year was \$669,456.76; expenditures, \$557,147.19. Of the 181 patents issued by the United States Patent Office for the week ending February 14, 1871, Illinois received 13, Iowa 5, Wisconsin 2, Indiana 10, Ohio 11, Michigan 3, Minnesota 1, Missouri 3, and California 4.

Vision of 1900.

Can any one realize the exceedingly probable fact that in 1900—only twenty nine years from now—the population of the United States will number 75,000,000 of, we trust, free and independent citizens? Yet, says the *New York Evening Mail*, Mr. Samuel F. Ruggles proves that this will be the case, without making allowance for annexations, North and South, that will certainly come about, Mr. Sumner and others to the contrary, notwithstanding. He shows the reasons for his prophecy in figures, and although the old saw that "figures won't lie," is the most unvarnished of proverbs, Mr. Ruggles' figures have acquired a reputation of their own, and a good one at that. For the past thirty or forty years he has been figuring about our internal and domestic commerce; and although he has often been accused of romancing in figures, the facts have always sustained his predictions. When, therefore, the ablest, most experienced, and most trustworthy statistician now living, tells us that we shall have a population of 75,000,000 in 1900, the younger part of the present generation may as well consider what awaits them in their maturity and old age.

Seventy five millions of people in the United States implies the settlement of the entire South and West by as dense a population as that of Massachusetts; the reclamation of the arid wastes of the great plains by irrigation; the development of States as strong as Ohio, Indiana and Illinois, along the Rocky mountains; the settlement of the Utah basin by four or five millions of agricultural and pastoral people; the development of a tier of agricultural States along our northern border, from Lake Superior to the Pacific, as populous and prosperous as Missouri and Minnesota; the growth of the Pacific States into commonwealths as rich and populous as that of New York and Pennsylvania. It means that New York will cover the whole of Manhattan island with a population of at least two millions, to say nothing of the outlying suburbs in New Jersey and across the East river; that St. Louis and Chicago will each become, in all probability, at least double its present size, especially the former, and that San Francisco will have half a million of inhabitants. The national debt will have become a tradition, and it will be difficult to understand how it was ever hard to raise three or four hundred millions a year by taxation. Such are the glowing visions which are extolled by the prosaic and careful figures of Mr. Ruggles. If any of our readers are unduly "hearith" in their tendencies, and inclined to get the blues over our future, we advise them to indulge in the line of speculation suggested by his striking statistics, and carry our predictions more into detail.—*St. Louis Jour. Com*

ERIE AND CINCINNATI, HAMILTON AND DAYTON.—Messrs McLaren, West and Matthews, who recently represented the Cincinnati, Hamilton and Dayton Railroad in a conference with the Erie Directors, have returned. They report that the contract between the two roads at \$180,000 per year has been renewed. There are other matters settled upon in this connection, among which is the completion of the Muncie and Fort Wayne road.

The Canadian fisheries are estimated at \$50,000,000 a year, employing 80,000 men.

Spontaneous Combustion.

A contributor to the *Boston Journal of Chemistry* says:

"Any light that can be obtained on spontaneous combustion adds not a little to the value of real estate. We believe a large percentage of the fires charged to incendiarism are really owing to spontaneous combustion, so called. We purpose giving three cases, two of which have come under our own experience.

"1. Within a year, twenty-eight rolls of cotton cloth in one of our large dyeing establishments were dyed black and were delayed a few days before they could be starched and finished. Two of these rolls were discovered to be on fire, not in flames but in a smoldering condition, or charred into tinder; a third roll was so hot that hands could not handle the cloth, and the wooden roller upon which the cloth was wound was heated almost to the point of ignition.

"The rolls of cloth destroyed were the first dyed, and consequently had been longer exposed than the others, which in a measure explains why all the rolls were not in the same condition.

"In the dyeing, the first rolls were dyed without washing, by an oversight of the dyer. This is the point of importance, as the chemical salts were left in the cloth. Logwood, potash, sulphate of copper and sulphate of iron constituted the dye, and we suggest this explanation as the probable cause of the fire. The potash and sulphate of iron change to sulphate of potash and hydrate of iron, by the absorption of oxygen from the atmosphere, or from moisture in the cloth, and the heat thus developed reaches the point of ignition. Cloth in drying is very liable to contain heated moisture.

"2. Within a year a fire was discovered in a silk-mercer's shop in London. The fire originated in a lot of black-dyed silk, and was discovered, as in the first instance, before flame had burst out. The conclusion reached was, that it was not safe to have black-dyed silk in large masses, and that each piece ought to be so placed as to allow a free circulation of air. We think it quite probable that the explanation of the combustion is the same as in the preceding case.

"3. In trying to get rid of rats in a dwelling-house the floors were taken up in order to cut off their ingress, if possible. The box that held the water pipes was found to be a favorable resort for the vermin, and had actually been on fire. The sides were charred, but there had not been sufficient air to sustain combustion. Upon investigation as to the cause of the incipient fire, we are not left long in doubt, for a store of remnants of greasy cloths used in washing dishes were found, which had been brought by the rats from the kitchen. Some of these were well saturated with grease and oils. This fire was quite a distance from the kitchen range, forty feet at the least.

"It would be very natural in all these cases, if the real causes had not been so apparent, to attribute the origin of the fire to incendiarism.

"We have a very firm impression that the introduction of coal oils for lubrication of machinery has very materially reduced the number of fires from spontaneous combustion, owing to the fact that the coal oils do not absorb oxygen; and that for this reason, if for no other, insurance companies can afford to insure mill property for less rates than they charge at present."—*Scientific American*.

The Manufacture of Needles.

Although of universal use and the most ancient origin—having been known either in a rude or finished state ever since fig leaves were sewed into aprons in the Garden of Eden—the needle has a history with which very few of those who use it daily and hourly are conversant. The process of its manufacture is an extremely interesting one. A coil of wire, such as is used for this purpose, will ordinarily produce about 50,000 needles. It is first cut by huge shears into lengths double that of one needle, and the wires are straightened by being rubbed backward and forward upon each other while red hot with a curved iron bar. The "pointing" is next attended to, and is done upon a dry stone revolving very swiftly and partly covered with a sheet-iron hood through which a current of air passes. This hood protects the workmen from the deadly inhalation of fine particles of stone and steel which formerly caused a fearful mortality in this branch of industry. The stamping requires the use of a fixed lower and movable upper die, corresponding in form and operated with the foot; and the eyeings is done, usually by girls, with a double-pointed vertical punch, two needles being pierced at each descent. Children are then employed in "spitting" the double needles or threading them on short wires, after which they are broken in two and the bar left in stamping filed off. The needles are then made red hot and suddenly cooled by dipping them either in oil or water, (the former is much preferred.) Having been again heated they are gradually cooled and thus "tempered," ready for scouring in oil and emery, in which they are rolled incessantly sometimes for a period of eight or nine days. They are then laid out evenly, the heads "blued" or softened with a red hot bar and the eyes drilled and burnished until perfectly smooth, in order that the warrant "not to cut in the eye" may be given. Finally, the needles are ground and set, an exquisite polish given them upon buff leather, and the counting, folding and packing conclude the work. It should be remembered that twice or thrice in course of their manufacture it is necessary to sort them carefully, throwing out the broken and straightening the bent needles. How, after so many operations requiring the greatest care and dexterity they can still be sold cheaply, would be a mystery, were it not for the marvelous increase of productive power obtained by the employment of machinery, division of labor and systematical conduct of business.

The census of Washington City presents some interesting features. Every State and Territory in the Union, with the exception of some of the very youngest of the Territories, is represented in the nativity of the people. The population of the city born in the United States is 60,038 whites, 35,391 colored and 13 Indians. Of the foreign born, there are natives of five continents and upward of fifty different countries, and eleven born at sea. The greatest number from one country is 6,948 from Ireland, from Germany there are 4,133, and from England 1,235. The total foreign born population is 13,757.

Copper and brass may be coated with zinc by immersing the article to be coated in a boiling bath of sal-ammoniac containing either sheet or powdered zinc. The zinc thus deposited is brilliant and firm.

HEATING BY WATER.—"Having to draw up some remarks upon the circulation of water in hot water pipes," says Mr. Alfred Smee, "it occurred to me that the flow and return might be managed by the use of a single pipe instead of two as now universally adopted. I directed the experiment to be tried by affixing to the socket end of a four-inch pipe an inch supply pipe from an ordinary boiler, and a second pipe communicating with the bottom of the four inch pipe and the bottom of the boiler.

"As I expected, the circulation was the most perfect and rapid, the hot water flowing along the upper surface of the pipe, and the cold water returning along the lower surface. Two currents in opposite directions were created in the pipe and the action was so perfect that I ordered to be fitted up forthwith a frame which has been in operation ever since. This mode of heating by a single pipe may be no doubt of frequent use, and manifestly, from the simple and portable nature of the apparatus the arrangement will commend itself to the attention of horticulturists."

The shipping of the world, according to the Bureau Veritas the French Lloyd's, is composed of 59,518 sailing vessels, measuring in the aggregate 16,042,498 tons, and 4,132 steamers, measuring 2,793,432 tons. The most important nations in the list are as follows: England has 23,165 sailing vessels, measuring 6,993,153 tons, and 2,426 steamers, measuring 1,651,767 tons. The United States has 7,025 sailing vessels, measuring 2,400,407 tons, and 597 steamers, measuring 513,792 tons. France has 4,968 sailing vessels, measuring 891,828 tons, and 288 steamers, measuring 212,976 tons. The North German Confederation has 4,320 sailing vessels, measuring 1,046,044 tons, and 127 steamers, measuring 105,131 tons. Norway has 3,652 sailing vessels, measuring 989,882 tons, and 26 steamers, measuring 7,321 tons. Italy has 3,395 sailing vessels, measuring 907,570 tons, and 86 steamers, measuring 36,358 tons. Spain has 3,035 sailing vessels, measuring 545,607 tons, and 148 steamers, measuring 72,845 tons.

THE NEW SUBSTITUTE FOR SILVER—Minargent, recently invented in Paris, and which may be compared to silver, possesses according to the London *Mining Journal*, nineteenth of its whiteness, malleability, ductility, tenacity, sonorousness and density, while it has a superior metallic lustre, wears better, is less liable to be acted on by the emanations of sulphuretted hydrogen and is less fusible than silver, minargent may be used for all purposes to which silver or other white metals or alloys are applicable. It is composed one thousand parts of pure nickel, fifty parts of pure tungsten, and ten parts of pure aluminum, and also the considerable proportion of nickel which they have succeeded in alloying with the aluminum. The metal is formed into ingot and molded in sand in the ordinary way.

The total product of sugar in the world is estimated to be 2,800,000 tons, in the following proportions: sugar cane, 2,000,000 tons; beet, 630,000 tons; palm, 140,000 tons; maple, 30,000 tons. Beets furnish one quarter the sugar product of the world.

About three-fourths of the lead used in the United States is said to be imported.

Arizona contains 70,000,000 acres.

Pentagraphic embroidery is the name applied to an ingenious method of performing ornamental needle work, invented by Mr. Billwiller, of St. Gall, England. A number of jointed frames are employed, each carrying tambouring or sewing apparatus. They are so arranged and connected together that the needles they carry may be made to traverse in any direction over the surfaces of the fabrics to be embroidered, and that the movements of the several needles shall be simultaneous and similar. The needle frames are also connected with a pentagraph having a tracing point capable of being led by the workman over the lines of a pattern which it is desirable to copy, and when this is done the needles will each travel in and work along a path similar to that passed over by the tracing point. Thus each needle will produce embroidery resembling the pattern, but not necessarily of the same size; usually it is preferred that the pattern should be on a larger scale than the work produced by its means.

The cost of the occupation of Alaska by the United States is \$10,388 a month, besides supplies, and is divided as follows: army, \$3,900; navy, \$3,500; revenue cutter, \$2,200; and Custom House, \$700.

7-30 GOLD LOAN

OF THE

Northern Pacific Railroad

RAPID PROGRESS OF THE WORK.

The building of the Northern Pacific Railroad, (begun July last), is being pushed forward with great energy from both extremities of the line. Several thousand men are employed in Minnesota and on the Pacific coast. The grade is nearly completed 264 miles westward from Lake Superior; trains are running over 130 miles of finished road and track laying is rapidly progressing toward the eastern border of Dakota. Including its purchase of the St. Paul & Pacific Road, the Northern Pacific Company now has 413 miles of completed road, and by September next this will be increased to at least 560.

A Good Investment. Jay Cooke & Co. are now selling, and unhesitatingly recommending as a profitable and perfectly safe investment, the First Mortgage Land Grant Gold Bonds of the Northern Pacific Railroad Company. They have 30 years to run, bear seven and three-tenths per cent. gold interest (more than 8 per cent. currency) and are secured by first and only mortgage on the ENTIRE ROAD AND ITS EQUIPMENTS, and also, as fast as the Road is completed, on

23,000 Acres of Land to every mile of track, or 500 Acres for each \$1,000 Bond. They are exempt from U. S. Tax; Principal and Interest are payable in Gold; Denominations: Coupons, \$100 to \$1,000; Registered, \$100 to \$10,000.

Bonds for Bonds. Northern Pacific 7-30's are at all times receivable at TEN PER CENT ABOVE PAR, in exchange for the Company's Lands, at their best cash price. This renders them practically INTEREST BEARING LAND WARRANTS.

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CINCINNATI, - THURSDAY, JUNE 8, 1871.

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The Industry, Trade and Commerce of Cincinnati.

We have received from the Board of Trade its Annual Report, and a more interesting document it would be hard to find. It gives a full view of Cincinnati in all its outward developments of growth, trade, industry, manufactures and commerce. We can only glance at it here in some of its most important points:

1. *Of manufacturing and mechanical industry.*—For three successive years the aggregate results were as follows:

	Values.	Hands.
In 1869.....	\$104,657,612	55,275
“ 1870.....	119,140,089	59,354
“ 1871.....	127,459,021	59,827

In 1871, each “hand” on an average turned out \$2,130 in value of product. How was this composed? The report gives the following elements, viz:

Cash capital invested.....	\$51,673,741
Value of raw material.....	66,040,085

Let us suppose that the profits on capital are 10 per cent, and that is about the average of profits on capital in the State of Ohio, then we have these results, viz:

Value of raw materials.....	\$66,040,085
Interest on capital.....	5,167,374
Paid for labor.....	56,251,562

Value of products.....\$127,459,021

The proportions are:

Raw material.....	52 per cent.
Labor.....	44½ “
Profits of capital.....	3½ “

The 3½ per cent. on products make 10 per

cent. on the investment. The striking feature here is, that in the city of Cincinnati are paid out fifty-six millions of dollars per annum for labor. This is about an average of \$1,000 per annum. But in this, it must be observed, are included the proprietors, cashiers, foremen, book keepers, clerks, and thousands of skilled laborers. Nearly all of these get more than a thousand dollars per annum. This fifty-six millions is expended in all the necessities of life. It would be interesting to know how much of this great sum must be paid for product which must come from without the city; for, it must be observed, that for clothing, rents, furniture, and a large part of all used in a family, the money is paid for things produced in the city; but the whole mass of food, and of the raw material of other products, must be paid for without the city. Let us now look into some of the classes of manufacture:

1st, we have the various products of iron, \$20,804,000, and 10,723 hands.

2d, of wood, \$12,700,000, 27,600 hands.

3d, of liquors, \$17,945,000, 2,334 hands.

4th, of leather, \$7,227,000, 4,647 hands.

5th, of clothing, \$12,626,000, 12,663 hands.

We need not enumerate others. The above sufficiently illustrates the chief subjects of industry in this city. One of the most interesting points in the manufactures of Cincinnati is the great variety of arts and employments. There are in Cincinnati 363 different branches of industrial employments.

2. *Of commerce.*—The exports and imports of Cincinnati for 1869 and 1870 were as follows:

	1869.	1870.
Exports.....	\$163,084,358	\$193,517,690
Imports.....	283,927,902	312,978,665
Total commerce.....	\$447,012,260	\$506,496,355

Among the articles of export which went to pay for the 59,000 hands employed in manufactures, etc.:

Furniture.....	\$8,892,000
Candles.....	1,500,000
Chairs.....	1,000,000
Manufactures of iron.....	5,000,000
“ leather.....	1,200,000
“ liquors.....	22,000,000
Flour.....	3,000,000
Meats.....	14,500,000
Oils.....	7,000,000
Tobacco.....	15,000,000

It is obvious that the labor part of these manufactures are fully compensated by the exports of products.

The shipbuilding was as follows:

Steam vessels.....	28	11,753 tons	\$752,000
Barges.....	15	8,113 “	77,600
Canal boats.....	9	466 “	15,300

The vessels enrolled at the port of Cincinnati in 1870 were:

Vessels.....	282
Tons.....	53,230
Value	\$1,727,090

3. *River commerce.*—A very interesting article in the Trade report is that which relates to the actual commerce of the Ohio. It is far beyond what any one would at first imagine. Indeed, we did not suppose it could be so great; but on examination of the statistics given we suppose they are not exaggerated. The total annual value of river trade is given at \$716,000,000. Referring to the different ports, we find the following to be the values at the principal points, viz:

Cincinnati.....	\$170,000,000
Pittsburg.....	150,000,000
Louisville (including Portland & New Albany).....	34,000,000
Wheeling.....	30,000,000
Portsmouth.....	12,000,000
Evansville.....	12,500,000
Paducah.....	40,000,000
Smithland.....	30,000,000
Steubenville.....	8,000,000
Pomeroy.....	8,000,000
Ironton.....	5,000,000
Maysville.....	8,000,000
Ripley.....	5,000,000
Madison.....	12,000,000
Jeffersonville.....	5,000,000
Cairo.....	20,000,000

In looking into the river trade of the different States which border on the Ohio river, we find in the aggregate the following results in all but very small places:

Pennsylvania.....	\$160,000,000
Virginia.....	39,000,000
Ohio.....	222,000,000
Kentucky.....	106,700,000
Illinois.....	21,650,000
Indiana.....	65,800,000

The reader will be struck with the disparity between the south and the north sides of the Ohio. Kentucky borders the entire south side of the Ohio from the Big Sandy to Cairo and in that entire distance has in the aggregate about \$120,000,000. In the same distance (from Big Sandy to Cairo), Ohio, Indiana and Illinois have a river trade of \$300,000,000. If Kentucky had shown the same spirit and energy in making public works and developing her resources, she might have come nearly up to the industry and commerce of the opposite shore.

The display of commerce, trade and industry, both in Cincinnati and in the Ohio valley, made by this report of the Board of Trade, is, considering the newness of the country, most wonderful; and there is no reason to suppose it will not be continued through many years to come. The development of the Ohio valley is not half complete. Nay, it will be within bounds to say, that it admits of fourfold the population, the industry and commerce, which it now has, and probably within another generation will receive.

NEW ORLEANS, MOBILE & TEXAS RAILROAD. —Track-laying on the first western division of the New Orleans, Mobile & Texas Railroad was completed on Saturday to Donaldsonville, 63 miles from New Orleans, and the road will soon be open for traffic to that place. The grading is completed 20 miles further on.

NARROW GAUGE.

Festiniog—The Cradle of the New Railway System—History of the Initial Narrow-Gauge Road in Wales—An English paper on Railways—Three feet Against Four Feet Eight and a Half.

We give place this week to two of six most interesting letters upon this subject. They were prepared by a gentleman thoroughly competent for such an undertaking, and after he had given the question a most complete examination.

A recent letter to us from an experienced and well-known American engineer says:

"Having visited the little line in Wales and gone over it several times with the manager, Mr. C. E. Spooner, I am quite ready to endorse all the English correspondent has said in its favor."

So are we, and therefore earnestly commend these epistles to our readers.

We shall conclude the series in our subsequent numbers.

These letters were first given to the American public in the *Philadelphia Press* by an English correspondent:

FESTINIOG, North Wales, May 11.

No. 1—The Festiniog Railway.

Wales, not to be behind the rest of the world, boasts its seven wonders, but one of the most wonderful things which it contains is not included in the number; I mean the Festiniog Railway.

This little line has attracted visitors from almost all parts of the habitable globe. "Wise men from the East"—Russian counts, Egyptian beys, Anglo-Indian engineers, Norwegians, Prussians, Austrians, French, Spaniards, Italians—have been to see and criticize the miniature iron road. New World visitors too, from the States, the West Indies, the Brazils, have crossed the Atlantic and made their way to the Welsh hills to inspect the "Tom Thumb" Railway, as it has been called. Scarcely a week passes but some authorized commission or some unauthorized self-appointed inquisitor puts in an appearance, and Mr. Spooner, the very courteous engineer and manager of the line, must sometimes begin to wonder whether he is secretary or showman.

Having just paid a visit to Festiniog and had a full opportunity of examining the line, I have thought that a brief description of it and a few remarks upon some points which it brings up for consideration would not be uninteresting to your readers.

If the Festiniog Railway were merely a curiosity I should need to apologize for proposing to trouble you with anything on the subject, for you have curiosities of your own in abundance, both natural and artificial, human and mechanical. But the Festiniog Railway is more than a curiosity; it is a practical illustration of a most important principle in railway construction. It is a *fact*—worth more than a thousand theories—which demonstrates that the railways of the future need not be the costly and often unremunerative works which they have been in the past; a fact which, I believe, is to bring about a revolution in railway matters and all that appertains thereto.

Any such fact, I judge, will be of supreme interest in a country with vast expanses of territory still unpeopled, vast resources still undeveloped; territory which must be peopled, resources which must be developed, mainly through the agency of railways; for railways, originally the outcome of civilization, the offspring of that ever fruitful parent, Necessity, have now become the very pioneers of civilization, the great ploughshares which open up the virgin lands that mankind may rejoice in the harvests of various kinds which they are waiting to produce. Like the outstretching branches of a tree, railways, wherever they spread themselves abroad, carry with them seeds like those from which they sprang, and thus population, industry and commerce are made to cover the earth.

To ordinary visitors the Festiniog Railway begins at Portmadoc (which is situated at the north-east corner of Cardigan Bay,) and runs thence to Dinas and Duffros, villages situated between Moel-Wyn and Manod, two slate bearing mountains in the Festiniog district. More properly speaking, however, the railway commences in the mountains, and ends at Portmadoc, for its primary object was to carry the slates from the quarries which abound in the Festiniog district down to Portmadoc, whence they are shipped to the various markets. This still forms the greatest part of the traffic on the line, although a large passenger traffic has been developed during the last eight years.

The line, which is a single one, was originally constructed in 1832 as a horse tram-way, and was made of a nominally two-feet gauge, the exact gauge being half an inch less than that. Eight years ago Mr. Spooner resolved on the bold experiment of converting it into a locomotive passenger railway, retaining the old way, and thus setting at defiance the preconceived theories of engineers as to the width of gauge necessary for a line over which steam engines should run. Years before that, the great "battle of the gauges" had been fought in the country, and four feet eight and a half inches had been adopted as the "standard" gauge—the narrowest which was at all consistent with the requirements of railway traffic. Even that was regarded by some as too narrow, and lines of seven feet gauge were laid down at enormous expense for the sake of some fancied advantages which never resulted. Had any one ventured to hint that a large traffic—equal to any which was then contemplated—might be conducted on a line of two feet gauge, he would have been scouted as a madman. Facts, however, are stubborn things, and not easily convicted of lunacy. A large traffic, both passengers and goods, is conducted on a two feet gauge; and, though I am not going to say that such a gauge is suitable for universal or even general adoption, the Festiniog experiment has made it clear to all but the most pigheaded that a much narrower gauge than that generally adopted is amply sufficient for the accommodation of all ordinary traffic, and may be constructed and worked at far less cost than the "standard" gauge.

Let us then take a trip along the interesting little railway, and see what it is and what it does. Arrived at Portmadoc Station, we find the train in waiting—a train which looks almost like a child's toy, so diminutive is it compared with what we are accustomed to see. One might nearly sit astride the engine, and the carriages look as though a push would set them going. The passenger carriages are of two kinds; in

those of the oldest make the seats are arranged lengthwise, the passengers sitting back to back as in an Irish jaunting car; in those of more recent build the seats are placed crosswise as in ordinary railway carriages, and accommodate three passengers to each seat, or twelve to a carriage; for summer tourists there are open carriages with lengthwise seats and awnings overhead; and for the quarrymen, large numbers of whom go up the line every Monday morning and return every Saturday, there are low, open cars without coverings, which each carry a dozen workmen. The carriage floors being raised very little above the ground level, there is no need for platforms at the stations, and one step lands us in the carriage. Leaving Portmadoc, we pass along a strait and nearly level embankment almost a mile in length, which carries the line over Traeth Mawr, or the estuary of the Beddgelart river. This being crossed we immediately commence our ascent into the mountain country, the line from this point rising the whole way until it reaches its terminus; the gradients vary from 1 in 60.68 to 1 in 186—the average gradient being 1 in 92 for 12½ miles. We can hardly help crediting the little engine with a conscious pluck and determination as it manfully climbs these steep inclines and draws after it its long train of carriages and wagons. The line runs through the most enchanting and romantic scenery, and at times in our upward journey we look straight down into the beautiful, fertile valley below, three or four hundred feet beneath us, and along it to the sparkling sea beyond, while the rugged rocks rise high on the other hand and we gaze up to the mountain tops. On we go along our winding way, turning and twisting, as the engine, like a thing of life, seems to choose its mountain path with the nicest discrimination. At times the curves round which we sweep are so small and follow each other in such rapid succession that neither the engine nor the brake van can be seen by a passenger in the middle of the train, and the train itself will be on three different curves at once; at other times the line takes a wide sweep along the side of a great natural basin, almost doubling back upon itself as it seeks its way to higher ground. The curves, indeed, form one of the most marvelous features of this little line. The railway is nearly all curves; in some cases they are not more than 1½ chains in radius, yet trains glide round them with the utmost ease, clinging to the mountain sides and following their outlines with unfailing fidelity. Part of the journey, by invitation of Mr. Spooner, we perform on a log of timber some 50 or 60 feet in length; this affords us capital opportunity of judging of the capabilities of the line, and we are no less surprised than pleased to find that we pass over the line as steadily and smoothly as in most first class carriages on ordinary lines. The log is carried on a couple of "bogies" trucks, and its passage over the sharp curves is absolutely imperceptible. As we approach the upper end of the railway we see, on either hand, several branches running high up into the mountains to the quarries, from which the slates are conveyed to the port below. On all these, the gradient being very steep, the traffic is worked by gravity, the loaded trucks coming down to the quarry termini on the main line and drawing the empty trucks up by means of large windlasses. The return journey down the main line is also performed by gravity. Taking our seat in a little open car we make a rapid descent to Portmadoc, spinning along at the rate of about thirty

miles an hour without either traction or propulsion, thus serving to show us very forcibly the gradients with which the engine had to contend on the upward journey.

For its whole course the line, as will have been gathered, runs through a rocky country, yet, owing to the sharp curves which have been available through the use of the very narrow gauge, cutting, tunneling, &c., have been avoided in a very remarkable manner. The greatest cutting is 27 feet, the greatest filling or embankment 60 feet, and there are only two tunnels in the 12½ miles, one of 730 yards and the other of 60 yards.

The amount of work done by this little line is astonishing. In 1869 between 9,000 and 10,000 tons of goods and minerals per mile passed over it, and from 8,000 to 9,000 passengers per mile, a traffic equal to that on some of our most flourishing "standard" gauge lines. Seven locomotives are employed, including one "Fairlie" engine, "The Little Wonder," of which I shall have more to say hereafter, and the rolling stock consists of 14 passenger carriages, 32 quarrymen's carriages, 40 goods, coal and lime trucks, and 852 slate trucks. The slate traffic renders the working expenses exceptionally high, inasmuch as the company have to supply and keep in repair two-thirds more rolling stock of slate wagons than if the slate companies delivered their produce at the upper terminus, besides the cost of oil and grease and additional stuff for the same; then, all the slate wagons have to run empty one way over the whole length of the line. Notwithstanding this and other drawbacks, and the fact that the rates are the same as on most other lines, the working expenses of the line contrast favorably with those of other companies. On the London and North-western Railway the percentage of working expenses to gross receipts is 47.84; on the Great Western, 48.616; on the North London, 52.7; on the Metropolitan, 54; on the East Indian, 49.4; on the Great Indian Peninsula, 63.2; on the Bombay and Baroda, 70.7. On the Festiniog line the percentage is 44.5, and if allowance were made on the most moderate scale for the exceptional circumstances to which I have referred, the working expenses would not be more than 31 per cent. of the gross receipts.

I was somewhat anxious to know what had been the effect of the railway upon the quarries and the port, and was scarcely surprised to learn that both had been developed in a very rapid manner. Portmadoc, from being a little coast village with an occasional vessel in its bay, has become a thriving port with numerous wharves and many ships.

"It's the slates," say some of the quarry proprietors, "that have led to the making of the railway." They forget that there are two sides to the question, and that it may be said with as much propriety, "it's the railway that has been the making of the trade and of the port." So will it always be.

I fear that my letter has been unduly long, but I will promise in my next, in which I want to read one of the lessons taught by this little railway, shall not be so lengthy.

No 2—Railways or No Railways.

The experiment at Festiniog has made it evident that by adopting a narrow gauge the benefits of a railway may be secured in a district where otherwise it would be impossible to provide them. To quote the words of a committee of the Massachusetts House of Representatives, "It is a wonder of mechan-

ical science, and a lamp of hope to the railway forsaken everywhere." The Duke of Sutherland, who accompanied the Russian Commission on their visit to Festiniog last year, exactly hit the mark when he said that the question of gauge was, in many districts, the question of *railways or no railways*.

Engineers have, in too many instances, overlooked this most important point. Wedded to old ideas, determined not to see a fact which was in contradiction to their theories, they have opposed a reduction of gauge, either altogether ignorant or altogether careless that their advice, if carried out, must inevitably debar sparsely populated or undeveloped districts from ever obtaining the facilities of railway communication, and I am not exaggerating when I say that through their absurdly extreme conservatism and their willful blindness many districts have been practically shut out from the world which might now have been teeming with population and rich in wealth of every kind.

How comes it that existing railways in England are not much more profitable than they are? It is not that they have failed to develop traffic. The most sanguine hopes of their promoters in this respect have been more than verified; facilities for cheap and rapid communication have everywhere been appreciated by the public. Yet, with all this success, numbers of railways continue to yield a poor return to shareholders on account of their great cost of construction and their great cost in working expenses, owing to the broad gauge which has been so generally adopted. Many a line is now a financial failure which ought to have been a remunerative speculation. Many a capitalist now receives no dividend who ought to have a first rate return upon his investment, just because the rails have been laid too far apart.

Hence, railway building is discouraged. Railways can not be built without capital, and capitalists are not easily induced to invest their money in speculations which, at best, are only likely to yield them a very moderate return, and that after some considerable time occupied in the construction of the line and development of the traffic.

Once let it be generally and clearly apprehended that narrow gauge railways—capable of accommodating all the traffic which is likely to come upon them—can be constructed at about *half the cost* and in *nearly half the time* which are necessary for railways on the old gauge, and the whole state of things will be altered, money will be freely forthcoming, railways will be pushed forward in all directions, and the benefits of cheap and quick communication will be carried into districts which are now hopelessly off the road.

The revolution has commenced, and nothing probably will now stop it. Already the little Festiniog line can count up a numerous family of descendants, and the tide of opinion is turning strongly in favor of the narrow-gauge lines.

In India, 5,000 miles of narrow gauge railway are to be constructed at once, and a considerable portion of the broad gauge lines already in existence in that country are to be converted into narrow gauge lines. Three of the four engineers appointed to report on the subject recommended a gauge of 2 feet 9 inches, and the fourth recommended the adoption of a 3 feet 6 inches gauge. The gauge decided upon is 3 feet 3 inches, the old gauge being 5 feet 6 inches. In reference to this important decision one of our leading engineering publications says: "The inaugu-

ration of the new railway system is a grand era in the history of India, and it will be interesting to note how much more rapidly her resources develop, her local miseries decrease, and her military positions strengthen, as the new and cheaper lines are rapidly run over the districts now standing so much in need of them."

In Norway, Sweden, Russia and France; in Canada, South America and Queensland, narrow gauge lines have been adopted for some time and are working successfully.

Nor have American engineers failed to see the advantages of the system. I am informed that in the mining districts of Pennsylvania roads have recently been constructed of a 2 feet 6 inch gauge. Only a week ago a report (to which I have already referred,) strongly recommending the adoption of a 3 feet gauge was presented to the Massachusetts House of Representatives, and will doubtless lead to immediate action. And I am glad to learn that out in the Far West you have an important line eight hundred and fifty miles in length projected on the same gauge, and that a portion of it is in rapid progress.

The choice is a most wise one, and will, without doubt, rapidly hasten the development of the rich tract of territory through which the line is to pass. Even were there nothing to be saved in the construction of the main line, it is of prime importance that it should be of narrow gauge. Every main railway should be an artery into which numerous veins or branches should run, thus causing the life-blood of commerce to circulate through the whole of the territorial system. Especially must this be the case in a mining district, where all the produce has to be gathered up and sent to distant markets, and where supplies of the necessities of life must be carried in day by day. These branch lines, if constructed by private individuals or mining or manufacturing companies, will most certainly be of narrow gauge, for those who construct railways as part of their "plant," and not as separate speculations, are wise enough to see that broad gauge lines are much too expensive to be indulged in. Hence the necessity that the main line should be a narrow gauge railway; the traffic of the branch lines must pass to and from it without transfer and without break of gauge, or time will be lost and expense incurred which will militate considerably against the utility of the railway.

This question of branch lines is a highly important one, and I am anxious that it should not be overlooked. If a railway company will take care to lay down such a main road that branches may be run into it at comparatively small expense, they may safely calculate that feeders will be constructed all along its route. Every little watershed of industry, so to speak, will send down its rivulet, and a full flow of traffic will roll along the main stream. If, on the other hand, the gauge of a main line be such that connections with it can only be made at a large cost, the sources of traffic will necessarily be confined to the narrow strips which lie along either side of the road, and the regions beyond will neither be benefited themselves nor contribute to the dividends of the shareholders.

As to the main line itself, I need scarcely point out that, if a narrow gauge railway can be constructed at about half the cost of a broad gauge line, the same capital will command the traffic of double the length of country. A thousand miles of road can be built where otherwise only five hundred could be built, and the case will be exactly parallel with that

of a man who can keep two shops going instead of one; if such a man can't make his fortune the faster, he has no one to blame but himself.

In a territory only partially developed the narrow gauge system offers an easy solution of a difficulty which must otherwise be felt. Over the water you are enabled by a sort of prophetic gift to term even your villages cities. You are well assured that before many years are over they will be cities in reality as well as in name. Meanwhile, during the period of growth, however brief that may be, are they to be without railways, destitute of the very chief cause of progress? Or is a heavy capital to be idle for some years whilst the railway waits for the increase of population and the growth of industry? The narrow gauge system, I say, affords the answer; a thousand miles of such territory may support a railway when five hundred could not.

In my next letter I propose, with your permission, to show how it is that one thousand miles of narrow gauge can be constructed at the same cost as five hundred miles of broad gauge.

[To be Continued.]

Union Pacific Railroad.

The road continues to make a splendid showing as respects increase of net earnings compared with the corresponding period last year. The April business was:

	1871.	1870.
Earnings	\$604,247 58	\$680,973 26
Expenses	268,401 94	474,355 65
Net.....	\$335,845 64	\$206,617 61

Here is an increase of net earnings of \$129,227 09 over April, 1870; and the total increase of net earnings since January 1 (4 months) has amounted to \$487,394 82. The percentage of expenses has been reduced from 69.30 during the first fiscal year (May 10, 1869, to April 30, 1870), to 53.16 during the fiscal year ending April 30, 1871. During the calendar year, 1870, this percentage was 61.34. The total net earnings of the second fiscal year just ended, amounted to \$3,435,257 09.

The road is now operated with increased efficiency—with an economy that has no precedent in its previous history. Never before was the promise of local development and business so hopeful. Along all the tributaries of the Platte there have been three years' full crops. Immigration is rapidly increasing. It is discovered that, taking into consideration the quality of the soil, the character of the climate, and the terms on which lands can be obtained, there is no more inviting locality in the near "Far West." The company are selling choice lands at \$2 and upwards per acre, at 6 per cent. interest; and with a slight, and, if necessary, no payment, down. The company, too, offer the immigrants the most liberal inducements, as regards rates both for freight and passengers—a large proportion of the amount paid being refunded to those who have settled on its lands.

Statistics show that there is about nine times as much coffee consumed in the United States as in Great Britain, and nearly three times as much tea consumed in Great Britain as in the United States.

Lease of the New Jersey Roads.

1. The lessee to pay the rent at all times during the said term, notwithstanding any future action of any of the corporations or their stockholders; and in order to secure the individual interest of each stockholder of the lessors, the right is given him to prosecute such suits as may be necessary to recover his proportionate part of the rent, and to use, if necessary, the name of the corporations lessors for that purpose; this provision, if desired, to be endorsed on the certificates of stock.

2. The lessee to pay all taxes, transit duties and other charges assessed or imposed on the lessors during said term.

3. The lessee to defend all actions, and pay all amounts that may be recovered against the lessors, and indemnify them from all claims, &c., during the said term.

4. The lessee to maintain and operate the demised works at its own expense, and to keep the same in thorough repair, working order and condition, fully supplied with rolling and floating stock and equipment, at least equal to that now used, so that the traffic and business shall be encouraged and developed, and full public accommodation given on reasonable terms.

5. The lessee to keep up the sinking funds of the lessors, and to pay all their debts and obligations as they shall become due.

6. As the several loans of the lessors shall become due, they are to deliver to the lessee a corresponding number of the bonds secured by the mortgage of April 20, 1871, whereby to discharge the same, any difference in value to be made up by the lessee. The difference between the total funded indebtedness and the amount authorized to be raised by the mortgage, to be applied only to permanent improvements on the works.

7. The title of all after-required property to be taken in the name of the lessors respectively, and such property to be subject to the lease.

8. To aid in the development of the "Harcimus cove" property, the lessors, whenever the lessee shall have spent \$400,000 in improving the same, to issue to the lessee 3,000 shares of their stock, and so from time to time until \$3,000,000 shall have been so spent in such improvements, and 22,500 shares of stock issued. No other or further stock to be thereafter issued by the lessors. The stock so issued to bear the same rate of rent as the present stock, and to be paid in like manner, clear of all taxes.

9. The lessee to assume all the contracts, liabilities and other obligations of the lessors. All rights under existing leases to remain in full force in the event of the future re-entry by the lessors.

10. The lessee to pay \$10,000 a year, to enable the lessors to keep up their corporate organization—the first half-yearly payment to be made July 1, 1871; and to provide suitable offices in Philadelphia, Trenton and New York, for the accommodation of the directors and officers of the lessors.

11. Such of the property of the lessors as may not be necessary for the use of the works may, with their assent, be sold, and the proceeds applied either to the permanent reduction of the funded debt, or to permanent additional improvements on the works.

12. The accounts of the lessee to be open to the inspection of the President and officials of the lessors—the lessees to furnish annually on or before April 1, a detailed statement of

the business for the previous year ending December 31, and the works and premises themselves to be likewise open for inspection and examination.

13. In case of default (continued for ninety days) in paying the rent, or performing these covenants and agreements, the lessors to have the right to re-enter upon the premises, to hold as of their original estate; the rent to be apportioned to the time of re-entry; no claim for damages for breach of covenant to be affected thereby.

14. At the end of the term, the lessees to re-deliver the works and premises to the lessors.

15. Covenant for further assurance.

16. These covenants to bind both parties, their successors and assigns.

The above is an abstract of the terms of the lease offered by the Pennsylvania Railroad Company to the United Companies of New Jersey. The capital of the New Jersey Railroad is represented by 62,500 shares, of which two-thirds would be 41,667; Camden & Amboy Railroad, 50,000, of which two-thirds would be 33,334; Delaware & Raritan Canal, 49,996, two-thirds, 33,331. Copies of the lease are placed for examination with Saml. Welsh, chairman of the committee, office 218 South Delaware avenue, Philadelphia; with Robert F. Stockton, in Trenton; with Alfred L. Dennis, Newark; and at the office of the New Jersey Railroad Company, No. 111 Liberty street, New York, at any of which points stockholders favorable to the ratification of the lease may leave their names.

By this lease, if accepted, all the property, real and personal, of the canal and railroads, passes to the lessees for 999 years, at a rental of \$1,948,500, equal to \$10 per share, annually, on all the present capital stock, clear of taxes, payable quarterly, beginning July 1.

The method of packing the tea which is sent from Shanghai to San Francisco, and thence over the Pacific Railway, is very peculiar. The tea is placed in small baskets, holding one pound each, and three of those baskets are adjusted to the mouths of three others and strapped together. Then fifteen of these parcels of six baskets are made up into a package, and securely covered with matting, and in this style the tea is sent to market. It is asserted that a cargo of teas can be sent from Shanghai or Foo Chow to Chicago in forty-five days. The freights are \$3 25 per hundred pounds to San Francisco, thence by the Pacific Railway to Chicago, \$4 20, making \$7 45 from Shanghai to Chicago. The through freight by rail from San Francisco to New York is \$6 per hundred, so that the cost to the Atlantic States is \$9 25. The tea, it is asserted, is of a good, strong flavor and perfectly sound. A short time ago a cargo of 11,000 packages, or 990,000 pounds of tea, was sent to New York by this route, and more recently a cargo of 40,000 pounds was sent to Boston.—*N. O. Com. Bulletin.*

CINCINNATI CENSUS.—The population of Cincinnati, by nativity, as shown by the census returns, are as follows: Total white, born in the United States, 130,763; colored, 5,860; total foreign, 79,612; of the latter, there are from British America, 1,193; England, 3,525; France, 2,093; German States, 51,220; Ireland, 18,625; Italy, 399; Scotland, 787; Poland, 167; Switzerland, 905; Wales, 507; Turkey, 1. Of those born in the United States there are: New England, 2,148; New York, 3,597; Pennsylvania, 3,597; Kentucky, 3,723; Indiana, 2,750; Ohio, 109,148.

Pacific Railway Business.

Only two short years ago an event was celebrated with great rejoicings, which has proved productive of larger benefits than were predicted by even the most sanguine and sagacious of its advocates and projectors. At that time was laid the last rail which united the Central and the Union Pacific Railways, putting the Pacific in uninterrupted communication, by rail, with the Atlantic coast and the intermediate great inland cities. The event has passed into the history of our railways, not merely, but of those of the world, and its anniversary is almost forgotten; but the benefits of that union began at once to be enjoyed, and have continued in an increasing ratio. This great trans continental highway, acknowledged to be the holdest enterprise of its nature ever consummated, has been a success from its very start.

To give an idea of the business done, we take the following details from the statement of C. W. Smith, Esq., freight agent of the Central Pacific road. The monthly returns of through freight sent east from California during the second year, ending May 1, 1871, were:

	Pounds.	Pounds.	
May	3,018,495	November.....3,364,029	
June	4,481,632	December ...2,334,316	
July	2,238,290	January.....1,521,988	
August	2,890,390	February....1,506,248	
September ...	3,268,394	March	2,744,316
October	3,293,273	April	4,913,071
Total			34,575,072

From 90 to 95 per cent. of this freight was shipped from San Francisco. During the first four months of 1870, the quantity of freight shipped to the East over the road was 1,509,000 lbs., making a total for the sixteen months ending May 1, 1871, of 37,084,186 lbs., or 18,582 tons, an average of over 1,100 tons per month.

In the first four months of 1871, the through freights were 10,412,857 lbs.; and for April, 4,798,071. Sacramento, Marysville, San Jose, and some smaller stations, furnished a small per cent. of the above, besides three cars of live stock. The inward freight traffic of the road is much larger than the outward, and embraces most all descriptions of merchandise.

For the sixteen months from Jan. 1, 1871, 29,392 passengers were carried East, and 39,651 West. To California it seems, then, that so far as population is concerned, saying nothing of business, the railroad has been of great benefit. And in addition to the through passengers are the way passengers, of whom no account is made above.

These figures—and they are but the suggestive beginnings, demonstrate better than any other argument, the fact that this great thoroughfare was not a figment of the imagination, but is a veritable and very beneficial fact, from which all sections of our country can be at all affected by it are to derive incalculable benefits in the future. Such a railway is a good thing to have in a country!—a good thing for its owners, under such management as the line now enjoys, and a good thing for the country.—*Chicago Railway Review.*

A wonderful discovery has been made of coal mines and oil wells 30 miles from Aspinwall, Central America. The mines are reported to be inexhaustible, and the coal is said to be of superior quality, equal, even, to the best imported.

The Quick Transit Question Solved at Last.

The "New York Railroad Companies" previously known as the Viaduct Railroad Company, was formally organized last week. Judge Hilton has been appointed as president, with W. R. Duncan as treasurer, and E. P. Barker as secretary. The directors were then classified by ballot as follows, to hold office for the terms respectively prefixed to their names:

For 1 year—A. O. Hall, R. O'Gorman, P. B. Sweeny, W. R. Travers, C. A. Lemont.

For 2 years—R. B. Connolly, E. B. Wesley, J. J. Bradley, J. F. Navarro, Charles L. Tiffany.

For 3 years—Aug. Belmont, A. T. Stewart, J. J. Astor, Wm. T. Blodgett, G. F. D. Lanier.

For 4 years—Wm. M. Tweed, W. G. Hunt, Levi P. Morton, J. O. Jones, Hugh Smith.

For 5 years—Henry Hilton, T. A. Osgood, Henry Smith, J. T. Johnson, Wm. B. Duncan.

These names, it will be seen, include the leading merchants, capitalists and politicians of our city. The management is composed of our most active and best known citizens, who would not lend their names to any impracticable or visionary scheme. Upon this point we have the most satisfactory assurances that the work will be prosecuted with due vigor and economy. The capital required will be forthcoming as it may be wanted. The directors alone could, if necessary, complete and equip the new railroad out of their own means without the issue of bonds to the public, but this will not be required. The first installment of \$1,000,000 capital has been already subscribed for. The city government will then issue bonds for \$5,000,000, at the usual rate of interest, said bonds to constitute a lien on the railroad. The estimated cost of the railroad is \$21,000,000, but we doubt whether it can be constructed for that amount.

The plan of the proposed railroad embraces many novel features, and includes some of the best ideas advanced from time to time by the various advocates of quick transit. It seems to be admirably adapted for the purpose required of moving the largest number of persons in the shortest possible time. It is free from the objections that rendered the Broadway Tunnel, the Beach Pneumatic Tube, the elevated and other quick transit plans so obnoxious to the public. Perhaps the very best proof of the feasibility of the new plan is the combination in its management of leading citizens who persistently opposed the various schemes that for a number of years past occupied public attention. All these persons connected with the new undertaking have reputation, money and character to lose or gain by the success or failure of the new railroad. They have the strongest possible motives for pushing it to a successful termination.

The much vexed quick transit question has been solved in a manner that few persons anticipated, and to which still fewer will object. It involves the transportation of our citizens from one point to another at a high level with, or perhaps a little higher than, the second story windows of our houses. Our people are to be whisked along on a railroad elevated 12 or 18 feet high at a rate of 50 or 60 miles an hour. It is estimated that passengers can be carried from the city hall to Harlem in 12 minutes. This is about as fast as the majority of people are desirous of going.

The gold crop of Montana, for the year 1870, has yielded \$44,000,000.

Minnesota Repudiating her Railroad Bonds.


We have been waiting to see how the election in Minnesota would settle the long outstanding question of the railway bonds. A year ago we published the statement of the bondholders explaining the transaction up to that date. In April, 1858, 80 per cent. of the voting population of Minnesota, then a territory, viz: 27,756 out of 35,490, adopted an amendment to the Constitution authorizing the issue of \$5,000,000 in aid of railroads. Two millions were issued, when in 1860 the amendment was expunged; and the State government has been ever since offering the holders, for their bonds, lands which the United States government had granted to the Territory of Minnesota for these railroads. The Territory became a State with the amendment to her Constitution, and issued 2,275 one thousand dollar bonds. The railroad companies failed, and contractors and other bondholders have never got interest. Before the amendment of 1860 which expunged that of 1858 was adopted, the Governor foreclosed the State mortgages on the railroads and bought in the stocks at a nominal price, and the State, by a law passed in March, 1862, granted the roads to new corporators. No interest on the old bonds has ever been paid, but in 1870 lands, said to be not one-fourth the par value of the bonds, were offered for them in exchange, and of course were refused. It is asserted by a writer in the *New York Post* that these repudiated bonds were actually accepted at the State Treasury of Minnesota as security for the circulation of local banks; and some of them were sold by the State Auditor to capitalists of the State, and the proceeds were applied to the redemption of the bank notes. The State has therefore twice issued the same securities and twice repudiated its obligations to pay interest on its paper. The election held last month, says the *Philadelphia Ledger*, turned upon a bill for a settlement by arbitration of the claims of the bondholders. This bill was submitted by the Legislature to the people, according to the provisions of the constitutional amendment of 1860, given above. It has been voted down, and the debt of the State once more distinctly repudiated. If this action were final, Minnesota would, indeed, have incurred undying reproach. But it is not final; such a question as this is never settled until the debt is paid.—*R. R. & M. Register.*

A new form of paste for attaching paper hangings to walls, and one which, besides possessing the merit of cheapness, has the advantage of preventing the paper from separating or peeling off, is prepared by first softening 18 pounds of finely powdered bole in water, and then draining off the surplus water from the mass. One and a quarter pounds of glue are next to be boiled into glue water, and the bole and two pounds of gypsum are then stirred in, and the whole mass forced through a sieve by means of a brush. This is afterwards diluted with water to the condition of a thin paste or dressing, when it is ready for use. This paste is not only much cheaper than the ordinary flour paste, but it has the advantage of adhering better to whitewashed surfaces, especially to walls that have been coated over several times, and from which the coating has not been carefully removed. In some cases it is advisable, when putting fine paper on old walls, to coat them by means of this paste with a ground paper, and to apply the paper hanging itself to this with the ordinary paste.—*Phila. Ledger.*

Improvements in Carpet Manufacture.

Some idea of the extent of the improvements made in the manufacture of carpets may be gained from the fact that thirty-five years ago Messrs. Deans, of Stewarton, in Ayrshire, Scotland, exhibited a carpet, eight yards by six yards, called the *Scotto Persian*, at the Museum of National Manufactures and of the Mechanic Arts, in Leicester square, London, which was considered at that time to be the most magnificent piece of tapestry ever manufactured outside of Persia. It was the custom then, in weaving carpets, to hang before the weaver a design or pattern, on which the various figures were traced in proper colors; the weavers looked at these constantly, because every stitch was marked upon them as they were to be in the work. By this means they always knew what colors and shades they were to use, and how many stitches of the same color. In this they were assisted by squares, into which the whole design was divided; each square was divided into ten vertical lines corresponding with the parcels of ten threads of the warp; and besides each square was ruled with ten horizontal lines, crossing the vertical lines at right angles. The workman, after placing his spindles of thread near him, began to work on the first horizontal line of one of the squares. The lines marked on the cartoon were not traced on the warp, because an iron wire, which was longer than the width of ten threads, supplied the place of a cross line. This wire was managed by a crook at one end, at the workman's right hand; towards the other end it was flattened into a sort of knife, with a back and edge, and growing wider at the point. The weaver fixed his wire horizontally on the warp, by twisting some turns of a suitable thread of the woof around it, which he passed forward and backward behind a fore thread of the warp, and then behind the opposite thread, drawing them in their turn by their leashes. Afterwards he brought the woof thread round the wire, in order to begin again to thrust it into the warp. He continued in this manner to cover the iron rod or wire, and to fill up a line to the tenth thread of the warp. The weaver was at liberty either to stop here, or to go on with the same cross line in the next division, according as he pressed the thread of the woof round the iron wire, and into the warp, the threads of which he caused to cross one another at every instant; and when he came to the end of the line, he took care to strike in the woof he had used. This row of stitches was again closed and leveled, and in the same manner the weaver proceeded; then with his left hand he ran a strong pair of shears along the finished line, cutting off the loose hairs, and thus forming a row of tufts perfectly even, which, together with those before and after it, formed the shag.

—*Cabinet Maker.*

 A Turkish recipe for a cement used to fasten diamonds and other precious stones to metallic surfaces, and which is said to strongly unite even surfaces of polished steel, although exposed to moisture, is as follows: Dissolve five or six bits of gum mastic, each of the size of a large pea, in as much spirits of wine as will suffice to render it liquid. In another vessel dissolve in brandy as much isinglass, previously softened in water, as will make a two ounce vial of strong glue, adding two bits of gum ammoniac, which must be rubbed until dissolved. Then mix the whole with heat. Keep in a vial, closely stopped. When it is to be used, set the vial in boiling water.

The Manufacture of Enameled Cloth.

Enameled cloth enters into many uses as a substitute for leather. It is light and pliable, and, at the same time, firm and durable. It has all the appearance of leather, with nearly its durability. Its most important use is that of covering for carriage tops, for traveling bags, and trunks. It is extensively employed in the manufacture of cushions and upholstering of a similar nature, and not rarely is it worked up into rainproof coats and pants. We briefly describe the process of manufacturing the black enameled cloth which enters mostly into consumption. The foundation of the article is cotton cloth of the best quality, made expressly for this manufacture. It varies in texture and width according to the kind of goods for which it is intended. The cloth is taken from the bale and wound upon a large iron cylinder, and looks in that position very much like the huge rolls of bome made cloth, seen by the ancients in the garrets and chambers of New England farm houses, when weaving was in fashion. It is now ready to receive its first coat, so it is slowly passed through the machine, across and between the huge iron cylinders, from the smaller of which, at the top, it receives its first coating of composition—a black, disagreeable looking substance, composed of oil, lamp-black, rosin, and other ingredients, boiled together, till about the consistency of melted tar. From between the cylinders, dressed in its black coat, the cloth is carried to and wound upon a huge wooden frame, resembling in shape the old fashioned reel. By an arrangement of spokes upon the arms of this huge wheel, each layer of cloth is kept separate, so that no two portions of the cloth will come in contact. The frame, with its contents when filled, is passed into what is called the heater, an apartment kept at a high temperature, for the purpose of drying in the coating or composition. After remaining in the heater a sufficient length of time to complete the drying process, it is removed and passed through the hands of workmen who make all the rough places smooth. It is laid on long tables, and the workmen alternately sprinkle with water and rub with pumice-stone, till the whole surface is made perfectly smooth. The cloth is then wound upon the cylinder again, as at first, and passed through the machine, to the huge reels and into the heater, and again under the pumice-stone. The cloth is passed through the machine five times, or till the required thickness has been laid on. After the last scrubbing down, the fabric is taken to another department, thoroughly varnished and again passed through the heater. It is now represented as a piece of cotton cloth, with a thick, shining coat of black, very much resembling patent leather. But it has not yet received its leather finish; so in another department it is passed through the enamel machine, which consists of another set of huge rollers, one of which covers its surface with regular indentations resembling the grain of leather. The cloth is now carefully measured, and rolled up in packages of suitable size, put up in boxes, and is ready for the market.—*Carpet Trade.*

CHESAPEAKE & OHIO RAILROAD.—Land sales continue on the lower peninsula with unabated activity. Within the past week Aspinwall has bought a farm near Newport News for \$25,000. The universal belief, well fortified with investments of northern capital in that region, is that on the completion of the Chesapeake & Ohio road it will seek deep water in Elizabeth city or York county.—*Norfolk Virginian.*

Transmission Through Pneumatic Tubes.

The writer having been employed in designing the extension of a pneumatic dispatch line in which some heavy gradients were unavoidable, it became necessary to ascertain by calculation the steepest gradient that could be employed so as to obtain a sufficient carrying capacity in the new section of the line under given conditions of engine power and of length. Almost every text-book and paper on the velocity of gases in pipes gave a different formula, and the author therefore found it necessary to attempt to construct a convenient expression for the speeds of carriers of given weight and friction, under various conditions of pressure, gradients and dimensions of tube. The problem of a successful pneumatic system is simply this: To make a given quantity of air expand from one pressure to another in such a way as to return a fair equivalent of the work expended in compressing it. It is obviously impossible to regain the full equivalent of the work, because the compression is attended with the liberation of heat, which is dissipated and practically lost. Therefore, in designing a pneumatic system, the first thing is to contrive means of compressing the air as economically as possible; and, in the second place, to get back the available mechanical effect stored up in the compressed air, irrespectively of the work employed in compressing and examining it. The writer considers that small pneumatic tubes may be worked more profitably than large ones. The great convenience of and the practical facilities for working small letter carrying tubes have been amply proved by the extensive systems already laid down in Paris, Berlin, London, and in other towns, as adjuncts to the telegraph services. Tubes of somewhat larger diameter would undoubtedly work satisfactorily. Even still larger tubes, of a moderate length, might also be found useful for a variety of special applications. But the author does not believe that a pneumatic line working through a long tunnel could, for passenger traffic, ever compete in point of economy with locomotive railways. A pneumatic railway is essentially a rope railway. Its rope is elastic, it is true, but it is not light. Every yard run of it, in a tunnel large enough to carry passengers, would weigh more than $\frac{1}{4}$ cwt. And it is a rope, too, which has to be moved against considerable friction, and in being compressed and moved wastes power by its liberation of heat. In a pneumatic tunnel, such as that proposed between England and France, in order to move a goods train of 250 tons through at the rate of twenty-five miles an hour, it would be necessary to employ simultaneously a pressure of $1\frac{1}{2}$ lbs. per square inch at one end, and a vacuum of $1\frac{1}{2}$ lbs. per square inch at the other. The mechanical effect obtained of the combined—pressure and vacuum—would be consumed as follows:

In accelerating the air . . .	29	} millions of foot pounds.
In accelerating the train . . .	12	
By friction of the air . . .	5721	
By friction of the train . . .	300	

The resistance of the air, therefore, upon the walls of the tunnel would alone amount to 93 per cent. of the total mechanical effect employable for the transmission; while the really useful work would be only about $5\frac{1}{2}$ per cent. of it. And to compress and exhaust the air to supply these items of expenditure of mechanical effect, engines would have to exert over 2,000 horse power at each end during the transmission, even on the supposition that the blowing machinery returned an equivalent of mechanical effect such as has never yet been obtained. This would not be an economical way of burning coals.

A New Motor.

Truly, this is an age of wonderful invention and rapid progress—so much so, that the genius of man, combined with science, brings to light, almost daily, some marvelous discovery, which is to urge forward still more rapidly the car of civilization now moving forward upon this continent. This reflection has been called forth upon perusing the following from the *New Orleans Republican*:

There was no small excitement last Tuesday, on Canal street, at the appearance of a street car careering along down from the horse station to the Clay statue, without horse, mule, or any other draft animal bearing affinity to the genus *Equus*, attached to it. Had there been any smoke or fiz-fiz about it, people would have supposed that a steam engine had been attached to a car to make it move, instead of a mule or horse; but there were none of the indications that belong to the steam motor, and those who witnessed the car which went by itself, were compelled to find some other solution of the problem. It was, in fact, an exemplification of the new motor invented by Dr. Lamm, and which bids fair to supersede the present modes of moving the street railroad car.

Some years ago a gentleman of large scientific attainments, Dr. Emile Lamm, conceived the idea of ammonia as a motive power. This idea he fully developed by repeated and careful experiments; and the result is, that street cars can be propelled by a force which, there is good reason to believe, will be equal in efficiency to horse or mule power, and altogether superior to it in economy.

The new motive power thus applied by Dr. Lamm, is the substance known as aqua ammonia. It is not necessary for the purposes of this article to enter into a disquisition concerning the chemical properties of ammonia which is popularly known as hartshorn, and is a strongly volatile alkali; its properties for common use being known to almost every housewife. It is sufficient to say that the combination of this substance with water and its subsequent evaporation by a heat at ninety degrees, produces a gas which, with the proper mechanical appliances, becomes a motor equal in efficiency to steam, but without the danger of explosion which is inseparable from this mechanical agency. Persons with a turn for scientific inquiry can easily learn from the inventor or the intelligent gentlemen with whom he is associated, the scientific or chemical and mechanical principles upon which this newly discovered motor is founded. The popular mind, however, will judge of the matter alone by the results.

On Tuesday afternoon, a party of gentlemen, among whom the *New Orleans press* was fully represented, made a visit to the station of the City Railroad Company, on Canal street, to witness the practical results of Dr. Lamm's invention, by its actual application. A car had been placed by the City Railroad Company at the disposal of the Doctor and his associates. This car had been fitted up for the purpose of the experiment. The ammonia apparatus takes up surprisingly little room, occupying not half of the platform ordinarily in front of the usual city car. To the uninitiated observer, this apparatus is little, if any, different from the apparatus of any ordinary steam engine. It is, however, essentially different, inasmuch that no fire whatever is required in working it. The ammonia with which it is charged is prepared at a station fitted up for the purpose, and it is calculated that at the end of each trip the container in each car will be promptly charged, and this operation will take up about as much time as it takes to change a mule at each trip of the car.

About half-past three o'clock, P. M., the ammonia locomotive was in readiness, and the car to which it was attached, containing a number of gentlemen, proceeded down Canal street. Making proper allowance for the circumstances that the car used was old and *passee*, nothing could be smoother than the travel down Canal street and back to the station.

The time of the passage was slightly faster than the time of a mule car, but it was evident to every one that the engineer (Dr. Lamm) did not put on the full force of the apparatus, and it was equally evident that the ammonia engine attached to this car could have made a train of half a dozen at least. The apparatus was so arranged as to be astonishingly under command, much more so than any vehicle to which an animal is attached. The trip to the Clay statue (where the car attracted the attention of a large and excited crowd,) and the return to the station, was eminently smooth and pleasant, and satisfied all who witnessed the experiment that it was decidedly and unequivocally successful.

The practicability of the new motor, of which Dr. Lamm is the inventor, is, we think, established beyond cavil. We will in conclusion make a remark in relation to its cheapness compared with the present system of motive power for street cars. In making these remarks we rely, of course, not on personal observation, but in the statements made by gentlemen connected with the enterprise.

To take the City railroad, which runs from the Clay statue to the cemeteries, for example, we are informed that to run a car during the prescribed hours, per diem, requires the services of six mules, at a cost of \$200 each, making an original cost of \$1200 for motive power to each car. The gentlemen connected with the ammonia enterprise claim that an engine to do all the work of these six mules can be constructed for \$400, making a saving in the original cost of \$800. The feed of the six mules now necessary for every car amounts to thirty-five cents per day. The cost of charging the ammonia engine per day will be about eighteen, making a saving of one dollar and ninety-two cents per day for each car.

Besides, it must be evident that the saving in the repairing of the road will be no small matter, as there will be no wear and tear from the feet of the animals now used to draw the cars.

We learn that this new motor has attracted no small share of attention among those who are likely to be interested in an enterprise of this nature, and that it will be, in a short time, adopted in more than one city railroad; and there is little doubt, eventually in all.

OUR PINS—There are eight pin factories in the United States, whose annual production is 2,000,000 packs, each pack containing 3,360 pins, a total of 6,720,000,000 pins. One manufacturer's agent in Boston, says the *Bulletin*, sells every six months from 700 to 1,000 cases of pins, each case containing 672,000 pins. The factory he represents turn out eight tons of pins per week. Hair pins are jobbed by the cask. There is but one factory that produces them. They turn out fifty tons per month. The machine that cuts and bends the wire makes 360 hair pins per minute, ready for Japaning. Yankee pins are saleable in nearly every city of the world, and the production and consumption increases each year about ten per cent. A very large percentage of the hair pins in general use are imported. The tariff does not protect this item of American industry, hence, the public pay for them just about one-third more than they are worth. Yankee enterprise is now seeking to develop a more rapid manufacture and a more desirable metal or substance, and in this way successfully compete with foreign makes and cut down the cost.

WHERE OUR GOLD AND SILVER GO.—The sales of silver in New York, for consumption by manufacturers of silver ware, including bars of refined and Mexican dollars, are said to aggregate \$3,000,000 annually. Including the consumption of precious metals by manufacturing jewelers of all sorts, this aggregate is increased several fold, the estimates for New York alone being \$15,000,000—that is to say, \$5,000,000 in silver and \$10,000,000 in gold—and this is exclusive of what is known as "rolled stock" or ribbons. The fact is asserted that there is more silver used for domestic purposes in the United States than in any other country in the world. This has been true only within the last few years. Thirteen years ago the sale of silver tea sets in this country was quite limited. Now, sets ranging in price from \$400 to \$800 are in constant demand, and a family that does not possess silver spoons or forks scarcely ventures to consider itself respectable. Almost every village in the country has one or more residents who make a pride of accumulating silver, and the example of such is contagious when circumstances will permit. It is a fact not generally known that before the war people in the Southern States bought more heavily of silver ware in proportion to their population than any other part of the country. Afterwards, much silver ware was sent to New York from that section to be melted, but now the Southern people are once more replenishing their stock. —*Chicago Jour. Com.*

COLORING OF FURNITURE.—Nothing contributes so much to enhance the beauty of a stuff intended for chairs, sofas, etc., as the selection of the wood to which it is attached; and, reciprocally, nothing contributes so much to increase the beauty of the wood, as the color of the stuff in juxtaposition with it. We should assort violet or blue stuffs with yellow woods, such as citron, maple, satin-wood, etc. Green stuffs with rose or red-colored woods, as mahogany. Violet or blue-grays are equally good with yellow woods, as green grays are with the red woods. But in all these assortments, to obtain the best possible effect it is necessary to take into consideration the contrast resulting from height of tone; for a dark blue or violet stuff will not accord so well with yellow wood as a light tone of the same colors; and it is for this reason that yellow does not assort so well with mahogany as with wood of the same color, but not so deep. Among the harmonies of contrast of tone, ebony or rosewood permits its employment with light stuffs to produce contrasts of color. It can also be employed with very brilliant, intense colors—scarlet, aurora, flame color, etc.

IN South Australia there are two branches of industry for the development of which the climate of the colony seems especially adapted. Of these the more important is sericulture, which starts under peculiarly favorable auspices, inasmuch as the silk-worm disease, which has for some years been prevalent in Europe is wholly unknown in Australia. The mulberry trees introduced by the government are in a most thriving condition. China and Japan are near at hand, and can supply any number of eggs, and experiments have already established the fact that the quality of South Australian silk is excellent. The other culture is that of Zante currants and Sultan raisins. There are numerous vineyards in South Australia, but the wine produced from them can not compare with European vintages.

SWITZERLAND, a country with a smaller population than that of Scotland, maintains an efficient army of 200,000 men, at an annual cost of \$3,330,000.

TO FIX DRAWINGS AND DESIGNS.—It may be useful to designers and others to know that pencil and chalk drawings can be set by washing them over with water in which isinglass or any colorless size has been dissolved; it may be necessary, after the first coat is dry, to go over it with a second coat. When this wash is perfectly dry, the work may be varnished with one or two coats of a white spirit varnish, or, what is perhaps preferable, a varnish of equal parts of Canada balsam and spirits of turpentine; this last varnish will produce a beautiful gloss, and possesses the advantage of being able to stand washing with soap and water. It will be found necessary to apply the isinglass solution very gently, and not go over any part a second time until the first coat shall be perfectly dry, otherwise the lines of the work may be disturbed. It is also necessary to keep the work from the dust, or particles may adhere to the lines and mar the beauty of the work; care must also be taken to have the brushes perfectly clean.

THE EXPORTS OF COMMODITIES, THE GROWTH, PRODUCE AND MANUFACTURE OF THE UNITED STATES, exported to foreign countries in American and foreign vessels, from the port of Philadelphia, during the month of April, 1871, amounted to \$1,276,687, of which \$432,209 was in American vessels, and \$844,388 in foreign vessels. The chief articles of imports were \$683,322 of petroleum, \$103,342 of wheat flour, \$100,150 of corn meal, \$29,978 of molasses, \$28,445 of tallow, \$29,170 of boards, \$26,000 of gold and silver coin, \$15,805 of oil cake, \$11,155 of cotton, and \$138,919 of coopersage. Of the nationality of the vessels engaged in this traffic 47 were American, 19 British, 12 Swedish, 3 North German, and 1 each of Italian, Russian and Danish.

FLOATING MAIL BAGS OF ZINC.—Eight hundred letters, says the Paris Rappel, have lately reached Paris from the provinces, by a singular means of transport. The carriage which brought them was a zinc ball, twenty five centimetres in diameter, and the rail on which it ran was the current of the Seine. It had occurred to M. Steenackers to fill two hollow hemispheres with letters and then solder the two together. These hemispheres had little wings like those of a mill wheel. The weight was calculated so that this ball thrown into the Seine moved at a certain depth below the surface. The current striking the wings made it progress rapidly. The postal administration in Paris was informed of the plan, and had the balls sent by M. Steenackers fished up at a water gate contrived on purpose.

THE DOMINION OF CANADA, IN 1870, imported from the United States goods valued at \$24,728,106, and exported \$32,984,652, making an excess of exports of \$8,256,546. The chief article of export was lumber, valued at \$4,064,044. The firewood exported was valued at \$419,616. The eggs sent from Canada to the United States amounted in number to 1,430,756 dozen. The other provinces exported to the United States the following articles: Nova Scotia sent coal, valued at \$398,621; salted salmon, \$471,004; sawed lumber, \$161,976; firewood, \$97,385; New Brunswick sent fish, salted and pickled, \$14,927; sawed lumber, \$194,236, and laths, \$92,396.

SUEL FOSTER considers European larch as several times more valuable than chestnut, and highly recommends it for fences, railway ties, sills to buildings, and many other purposes. Chestnut posts, he says, rot off in from ten to twenty years, while larch sakes have been used as piles in the London docks for more than a thousand years.

THE IMPORTANCE OF THE TIN TRADE OF ENGLAND may be gathered from the following statistics: The total number of mills fully or partially at work is stated at 164. The returns received from the 99 mills show the number of boxes of tin plate 866,985, and ofterne plates 298,892, making the total number of boxes 1,165,877. The actual weight of the whole returned is 54,314 tons. Estimating that the 65 mills not returned produced at the same rate as the 99 returned, they must have made 746,460 boxes, showing the total number of boxes of tin plate made in the year to be 1,912,337. According to this, the mills will have worked only three quarters of full time. But this estimate is thought to be too low, and the following is offered by an experienced manufacturer as being nearer the truth: Mills going or ready to work in 1869, 164; deduct 14 mills known to be stopping, and mills calculated to be making black plate, leaving the number of mills 150. These, making on an average 300 boxes for 48 weeks, would produce 2,160,000 boxes. But it is thought that 350 boxes per week must be nearer the average per mill. This would increase the estimate by 360,000 boxes, showing the total estimated value of tin plate in the United Kingdom in 1869 to be 2,520,000 boxes.

7-30 GOLD LOAN

OF THE

Northern Pacific Railroad

RAPID PROGRESS OF THE WORK.

The building of the Northern Pacific Railroad, (begun July last), is being pushed forward with great energy from both extremities of the line. Several thousand men are employed in Minnesota and on the Pacific coast. The grade is nearly completed 264 miles westward from Lake Superior; trains are running over 130 miles of finished road and track laying is rapidly progressing toward the eastern border of Dakota. Including its purchase of the St. Paul & Pacific Road, the Northern Pacific Company now has 413 miles of completed road, and by September next this will be increased to at least 560.

A Good Investment. Jay Cooke & Co. are now selling, and unhesitatingly recommend as a profitable and perfectly safe investment, the First Mortgage Land Grant Gold Bonds of the Northern Pacific Railroad Company. They have 30 years to run, bear Seven and Three-Tenths per cent. gold interest (more than 8 per cent. currency) and are secured by first and only mortgage on the ENTIRE ROAD AND ITS EQUIPMENTS and also, as fast as the Road is completed on.

23,000 Acres of Land to every mile of track, or 500 Acres for each \$1,000 Bond. They are exempt from U. S. Tax; Principal and Interest are payable in Gold; Denominations: Coupons, \$100 to \$1,000; Registered, \$100 to \$10,000.

Lands for Bonds. Northern Pacific 7-30's are at all times receivable at TEN PER CENT ABOVE PAR, in exchange for the Company's Lands, at their lowest cash price. This renders them practically INTEREST BEARING LAND WARRANTS.

Sinking Fund. The proceeds of all sales of Lands are required to be devoted to the purchase and cancellation of the First Mortgage Bonds of the Company. The Land Grant of the Road exceeds Fifty Million Acres. This immense Sinking Fund will undoubtedly cancel the principal of the Company's bonded debt before it falls due. With their ample security and high rate of interest, there is no investment, accessible to the people, which is more PROFITABLE OR SAFE.

Exchanging U. S. Five-Twenties. The success of the New Government 5 per cent. Loan will compel the early surrender of United States 6 per cents. Many holders of Five-Twenties are now exchanging them for Northern Pacific Seven-Thirties, thus realizing a handsome profit, and greatly increasing their yearly income.

Other Securities.—All marketable Stocks and Bonds will be received at their highest current price in exchange for Northern Pacific Seven-Thirties. EXPRESS CHECKS ON MONEY OR BONDS RECEIVED, and on Seven-Thirties sent in return will be paid by the Financial Agents. Full information, maps, pamphlets, &c., can be obtained on application at any agency, or from the undersigned.

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The Railroad Record.

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T. WRIGHTSON, - - - - } Editors
A. J. HODDER, - - - - }

CINCINNATI, - THURSDAY, JUNE 15, 1871.

The Railroad Record,

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WRIGHTSON & CO., Prop'r's

Once More about the Chesapeake & Ohio.

When we are considering the completion of the Chesapeake & Ohio to Cincinnati, we are not talking of a new road to the East, or to the West, or to the South-west, through Kentucky. We are talking of a road which shall give Cincinnati a through trunk line to the Southern Atlantic—that is, to the whole country from Richmond to the capes of Florida; and that is the grand want of Cincinnati, at the present moment. This want would unquestionably have been best supplied by a direct railroad through Kentucky to Knoxville, but since that can not be got, the next best and on the whole not much inferior route is that which the Chesapeake & Ohio will furnish, provided we make a connection with it. This matter is so plain, that we confess to no little surprise that there is not an immediate and earnest effort to carry it through. The Chesapeake & Ohio company will do all and more than all we ever expected. It is a strong company, with ample means, and with a force of 4,000 men actively at work. Nor is this all. The company will make a southern branch, which will make a through southern road! This part of the work we have not heretofore mentioned, and will now describe.

The charter of the company allows a branch south from the mouth of Greenhrier river, and this branch, being perhaps 65 miles in length, the company has determined to make, in order to secure an immense local traffic in coal and iron. This branch will be from the mouth of Greenhrier to the point where the Virginia & Tennessee road crosses New river. This will

give a direct communication with the whole of south western Virginia. The crossing of New river in the valley is in a direct line, and not very far from a point near the western terminus of the North Carolina railroad system. When the Chesapeake & Ohio reaches the Virginia & Tennessee, the connection with the Western road of North Carolina will undoubtedly be made. We see, therefore, that considering the mountainous region through which any road to the southern Atlantic must pass, the Chesapeake & Ohio will practically afford nearly as good a connection with the southern Atlantic as can be made. From Cincinnati to Wilmington (N. C.), is a straight line 465 miles, and the railroad communication can be made in 600 miles. In 24 hours a passenger from Cincinnati could reach Wilmington (N. C.), and in two days a barrel of pork could reach there. The result would be that Cincinnati would supply that whole section with provisions, grain, manufactures, &c. No successful competition could be carried on against her. She would be just as sure of the trade of North Carolina as she is of any part of Michigan by the Fort Wayne road.

In this way Cincinnati can secure the greatest part of that trade with the South which she has long coveted. And now we come to the practical point. She can not have these benefits unless she is willing to do something. No doubt it is the interest of the Chesapeake & Ohio to do all she can to facilitate a connection with Cincinnati, but it can not be expected that the company will make the road from Cincinnati to the Scioto; for she can take the road now making from the Big Sandy to Lexington and Louisville, and thence to the South. If Cincinnati wants a southern road to the Atlantic she must help make it. She must put her own shoulder to the wheel. The amount required will not be large, for there is the city of Portsmouth and four counties to aid; but those counties can not raise more than a third of what is needed. However this may be, it is certain that Cincinnati has not in many years had such a prize within her grasp, and if there be not a strong effort made to secure it, then Cincinnati must have lost all public spirit, and be in that inert if not hopeless condition in which she neither desires nor can expect future profit and extension. When a city gets into such a state, it will be in vain for sagacious minds to point out the road to success, or even foreign enterprise extend its aid. It will be beyond the reach even of fortune to favor her. We hope such is not the condition of this city. But it looks very much as if Cincinnati was willing to fold its arms, and be satisfied with making contracts for street pavements, avenues and parks, which are very well in themselves, but which will not increase the business of the city one particle.

Already all the railroads leading into the city are held by foreign corporations, who raise the price of freights (as they have just

done), and thus levy a tax not only on the western producer but the eastern consumer. Anything which will increase competition on these lines and especially make new markets at the South will be good for Cincinnati. This city is at this very moment at the feet of foreign corporations. They do not even condescend to keep a general office in Cincinnati, and all their officers are in other States; in fine, Cincinnati is, at this moment, in regard to railroads, a mere appendage of other cities, literally left out in the cold.

Now, if this city can make the tunnel, and get some roads to the South, making new markets, we shall soon have them at our feet. They will not only be willing to come here, but be much less exacting in their terms of traffic.

ON SCHOOLS GENERALLY,

And in the State of Ohio Particularly.

I begin by stating that in the references which I make to laws in this article, I use John Brown's and Wm. J. Duane's edition of the laws of the United States, published in 1815, under the authority of an act of Congress.

The first act to which I refer has this title: "An act to enable the people of the eastern division of the territory north-west of the river Ohio to form a constitution and State government, and for the admission of such State into the Union, on an equal footing with the original States, and for other purposes. Approved April 30, 1802."

The first section of this act is simply the formal authorization of the State government in the said western division.

The second section defines the boundaries of the State government authorized in the first section. See vol. 3, page 496.

The next law was one entitled "An act to provide for the due execution of the laws of the United States within the State of Ohio. Approved February 19, 1803." See vol. 3, page 524.

The third and last law to which I have occasion to refer in this article is entitled "An act in addition to and in modification of the propositions contained in the act entitled 'An act to enable the people of the eastern division of the Territory north-west of the river Ohio to form a constitution and State government, and for the admission of such State into the Union on an equal footing with the original States, and for other purposes.'" Section first of this act is partly as follows: "Be it enacted, &c., That the following several tracts of land in the State of Ohio be and the same are hereby appropriated for the use of schools in that State, and shall, together with all the tracts of land hereafter appropriated for that purpose, be vested in the Legislature of that State, in trust for the use aforesaid, and for no other use, interest or purpose whatever,

that is to say." An enumeration is then made, in a spirit truly liberal, of the said lands. See vol. 3, page 541. Act approved March 3, 1803.

This act was in full accord with the wishes of the people of the State of Ohio, who had then very recently formed a constitution and State government, and was truly expressive of the views of the Revolutionary fathers, and their sons who formed the government by which this law was enacted.

Let it be observed that it is not only the tracts of land in this enumeration that are devoted to common school education, but they are "appropriated together with all the tracts of land heretofore appropriated for that purpose." See section 7th of the act to enable the eastern division, &c., to form a constitution and State government, page 496, vol. 3, act approved April 30, 1802, in the edition of the laws already mentioned.

Thus the high endorsement of the common school system of Ohio was coeval with the existence of her State government. It is not to be supposed, however, that common schools were neglected anterior to her organization as one of the United States. In the lapse of time from 1787 to 1803 there were common schools there to some extent. Probably they were, in proportion to the population, as numerous and as well conducted as in any other State of the Union recently organized. It is not, even now, when many school teachers are highly respectable both for character and talent, but occasionally that we find one possessing the first class of talent. I have personally, in my youth, known one who besides good qualifications in the common English branches, would, had fortune favored him, have filled the chair of mathematics in a college with high credit. No doubt, in the wide dispersion at this day of our common school system, many such exist, and there is no reason to doubt that Ohio has her due proportion.

By examining the boundaries of Ohio we find that her geographical position is one extraordinarily favorable. The RECORD has more than once, with the usual high ability and sound logic that characterize its editorial columns, proved that Ohio occupies the gateway to the great Atlantic seaports. Her length is parallel to four-fifths of all the Atlantic ports that are and are likely to be in the future the emporiums of commerce on that vast ocean. This position gives her great advantages, and entails upon her corresponding responsibilities for the right application of her great resources. She has done well heretofore in her common schools, but no doubt she can yet do better; her colleges and academies are highly respectable, and will rise still higher.

Equal genius is not bestowed on all; but God has given common sense to ninety-nine in a hundred of our countrymen, and as a basis with a sound system of common school

education the great mass of both sexes may be developed into the virtue and intelligence which constitute the essential strength and true glory of a nation. It is in vain, as we have recently seen, that despotism in church and state utters its arrogant assumptions and claims superior wisdom in ruling nations. One of the necessities of its existence is the ignorance of the people, and hence it avoids common schools as poison, and where they are forced upon it by the fear of public sentiment, they carefully exclude the most useful knowledge. The result is, they rush foolishly into war; their thrones are demolished or sternly shaken. For a time a portion of them may remain in an impaired and shattered condition. They may even, when recruited by some patchwork remedies, make a desperate effort to regain their ascendancy, but they will surely be defeated, and a final victory be gained over them that shall end them forever.

With respect to what should be taught in common schools, it is proper to fix the limits.

Spelling, reading and grammar, all these should be taught well. There are various books now, some of which are judicious selections. In arithmetic, the four common rules and the rule of three and practice, and the calculation of interest both simple and compound. Composition, also, should be carefully required and mildly revised.

What is the proper course in the distribution of praise and premiums? Clearly it is proper to use them; but excess should be avoided in either, and the teacher should be emphatically impartial.

A question arises which has been vehemently agitated: Ought the Bible to be used in the common schools? My answer is promptly and unhesitatingly, yes. I join most heartily in the plaudits which have been bestowed on the Ohio judges who decided that neither by the constitution of the United States, nor of Ohio, is the use of it forbidden, and that it was in accordance with the constitution of Ohio to use it in the public schools. Illustrious men, for this enlightened and patriotic decision their memories shall be embalmed in the hearts of all good and enlightened citizens, and the blessings of millions now and forever shall be upon their heads.

Diderot was a famous infidel philosopher of the last century, who waged war upon Christianity, but his secret convictions of the exalted morality of the New Testament came to light. One day a familiar friend called upon him and found him giving his daughter instruction in the New Testament. His friend, an infidel himself, expressed surprise. "Ah, well," said Diderot, "after all, where shall we find better lessons of morality?"

Father Hyacinthe, in a sermon preached before the Franco-Prussian war, but after the war between Austria and Prussia, said the reason of the Prussian success was that the

Prussian soldier read his Bible and carried it in his knapsack. In the most recent telegraphic news from France to June 4, in a letter, he says: "The second empire treated social questions in the spirit of the Cæsars, instead of seeking to solve them by the dissemination of education. It more than ever imposed prolonged celibacy on soldiers, and legalized the prostitution of women. The Church also failed in its mission. It was too much occupied with dogmatic questions and too little with the instruction of its flock."

There are strong signs that in Europe light is beginning to radiate from various quarters on the importance of imparting instruction to the people generally; and to this end common schools are absolutely necessary. W. A.

Chicago River.

We learn by private letter that the Chicago river improvement is to be completed, and the waters of the lakes and the Mississippi to be mingled on the first day of July, 1871.

Of all the great works of this great city there is none that is of more importance than this. To the health of any compact community, there are two things absolutely necessary—pure water and pure air. The first they have obtained by tapping the bottom of Lake Michigan, two miles from the shore—a work though not difficult of execution in the blue clays of the lake shore, yet grand in its conception, and successful in its results. Should the supply at any future time prove inadequate by the present works, as is suggested by croakers that we have heard, it will be a simple and easy matter to duplicate or otherwise increase their capacity.

But it is to the supply of pure air, or rather the removal of a great nuisance, in the befouling effects of the sewerage of Chicago river, to which we desire especially now to refer. Heretofore, the winds of the lakes and of the prairies have watted the noisome breath and foul vapors of the Chicago river in every direction, spreading disease and premature death. This is to be remedied. The cut between Lake Michigan and the Illinois river is to be opened and the water let through on the first of July of this year, and a current established of four and a half miles an hour. As a sanitary measure this was absolutely necessary; but it has another bearing—its influence on commerce. It will open a new water line of traffic to Chicago, co-extensive with the Mississippi valley, and if properly developed can not fail to give an additional impulse to the growth and prosperity of the Queen of the Lakes.

WORK ON THE SHORT LINE.—A special dispatch to the Cincinnati Gazette, from Dayton, dated June 14th, says: This morning subcontractors commenced work on several sections of the Short Line Railway, between Middletown and Hamilton, and also between Miamisburg and Middletown.

New Music.

John Church & Co., the well known and gentlemanly publishers of popular music and dealers in pianos, have sent us the following new music:

"Return those Flowers to his Grave," by A. McClure Griffin. This is a song, the words touch the tender chords of the heart, and will bring back sweet memories of the loved ones gone before us. The music is very sweet.

"Golden Dream Waltz," by Joe A. Stipp. This is an easy piece, simple and good for beginners.

"Thy Hand," is a very sentimental song, nevertheless it is a very pretty piece.

"Unfortunate Tailor," by Sol Smith Russell, is a very excellent comic song, not surpassed by any of his former productions.

"The Clover Blossoms Kiss her Feet," by Oscar Leighton, as would be supposed is a "sweet thing;" we assure our readers that those who buy it will not be disappointed. Good words and sweet music.

"Oh, Say that You Forgive Me," by D. C. Addison, is also very good, but more pathetic.

"Portfolio Waltz," by L. B. Ross, is an easy piece, nevertheless pretty.

New Books.

"Thoughts for the Young Men and for the Young Women of America, or a few Practical Words of Advice. By L. U. Reavis. With the Ideal Man and the Ideal Woman, by Horace Greeley." Price \$1. New York: S. R. Wells, 589 Broadway. Cincinnati: Geo. E. Stevens & Co., 39 West Fourth St.

This is one of the timely little works of the season, and will undoubtedly be warmly welcomed by the young men and women of America, for whom it is particularly intended.

Mr. Reavis has done his work thoroughly. There is no mistaking his meaning. His encouragements are founded upon sound principles, and his warnings are such as every experienced man of the world would urge upon his sons and daughters. No young man or woman can read this book without being the better for it. If there is any life or aspirations for what is noble and good in them, it must be aroused, and this is the first step towards that development and culture which the author seeks to inspire.

Every parent ought to place this little book in the hands of his children as soon as they are matured enough to understand plain Anglo-Saxon language.

Its teachings are better than gold.

According to complete census returns, the population of California is 560,223, including 49,311 Chinese and 7,895 Indians. Of the total population, there were born in California, exclusive of 6,251 Indians and 435 Chinese, 163,151, and there were 209,827 born in foreign countries. The resident population of San Francisco is returned at 149,473, which total includes 12,022 Chinese and 1,330 colored.

NARROW GAUGE.

Paying and Non-paying Traffic—Carrying Capacity of the Road Wagons.—Why it would be Cheaper to Adopt the Narrow Gauge.—Drawbacks to its Introduction.—

FESTINOG, North Wales, May 11.

No 3.—Cost of Construction.

I said in my last letter that the cost of constructing broad gauge railways had in too many cases rendered the speculations financial failures, and so had discouraged to a considerable extent, the further development of the railway system, but that a clear and general apprehension of the fact that narrow gauge lines—fully equal to the accommodation of all the traffic likely to come upon them—can be built at about half the cost of lines of the ordinary gauge, must have the effect of inducing capitalists to invest much more freely in the work of railway extension.

It rests with me now to demonstrate that there will be such a saving as I have mentioned.

And here it will be well for me to define what I mean by a narrow gauge line. Do I mean a line of the same gauge as the Festinog Railway? Certainly not. The Festinog Railway, as I have shown, is capable of doing a vast amount of work; and the goods traffic upon it almost equals that upon the London & North-western Railway, one of our most flourishing lines; but yet it would undoubtedly be improved by a little extra width; the passenger carriages especially would be much improved thereby; and probably, if the line had been originally planned for a passenger railway, it would have been set out to a somewhat wider gauge. Other railways, which may fairly claim the title "narrow gauge," range up to a grade of three feet six inches or three feet seven inches, but careful calculation has shown that two feet nine inches or three feet is the maximum gauge of which the capabilities can be made fully available. This is a question depending principally upon the construction of the rolling stock, of which I will have to say more afterwards; at present it will be sufficient to give the result of the calculation without entering into the calculation itself. We will take, then, two feet nine inches as our narrow gauge.

Supposing that two perfectly straight and perfectly level lines were constructed side by side, one of 2 feet 9 inches gauge, and one of the "standard," or 4 feet 8½ inches gauge, there would be an unmistakable saving in favor of the narrow gauge. I am aware that it has been argued that there would not. The carriages on a narrow gauge would be considerably wider in proportion to the gauge than upon a broad gauge line (as I shall have occasion to point out subsequently), and it has consequently been said that if the carriages are almost as wide on a narrow as on a broad gauge there can be little saving in constructing the former. The width of the line itself, and, consequently, the cost of it, will be nearly the same in both cases. At first sight this would seem to be so, but it must be evident that with the narrow gauge, shorter sleepers will be required, and with shorter sleepers the formation will be narrower; then the formation (which is the area to be drained), being narrower, the water-ways on both sides will be narrower, too, and the whole width of the way will consequently be considerably less than where the rails have to be laid further apart. In the first place, then, the narrow gauge implies a saving of about twenty-five per cent. in the purchase of the right of way, and a saving to that extent in the cost of formation altogether may be calculated upon. Next, lighter rails and sleepers and less ballasting may be adopted, for the locomotives and trucks will be very much less in weight than those on the broad gauge. In some cases where the narrow gauge has been adopted, too light a rail may have been laid down, but it will be seen, I think, when I come to enter more particularly into the question of rolling stock, that a very great reduction may safely be made in the weight of the rail below that which is required for the broad gauge lines. The saving in permanent way, therefore, may, without doubt, be put down at 30 per cent. Bridges, culverts, stations, warehouses, engine and wagon sheds, and buildings of all descriptions will be somewhat smaller, and the saving under this head, though not very large, will still be appreciable and worthy of consideration. In the rolling stock, too, which may be included in the original cost of the line, there will be a considerable saving. It is sometimes argued that, as the carriages and trucks will be smaller and lighter, they will carry less loads, and therefore a greater number will be required to accommodate the same traffic; so that there can be no saving under this head. I hope to show, however, when we come to consider the comparative cost of working traffic on the two gauges, that there is an error. The truth is, that the carriages and trucks on broad gauge lines are *too large* and *too heavy* for the loads which they carry as a rule, and the same number of lighter and smaller vehicles would do all the work. The trains, therefore, on a narrow gauge line, instead of being longer than on the broad gauge, will be shorter, each carriage or truck being shorter than those now in general use, and yet carrying as great a load. This same consideration disposes of the argument sometimes put forward, to the effect that on a narrow gauge railway longer sidings, stations, warehouses, etc., will be necessary to accommodate the longer trains. If the trains themselves will be no longer, there is an end of the matter. Assuming, however, for the present, that more vehicles and longer sidings, etc., would be required on a narrow gauge railway, there would still be a saving of about twenty-five per cent. in favor of the narrow over the broad gauge, if, as I have said, the two lines were constructed side by side, and both perfectly straight and perfectly level.

But railways, unfortunately, are neither straight nor level; and directly we get away from those data the comparison in cost of construction tells much more in favor of the narrow gauge, and this is a constantly increasing ratio as the character of the country approaches that of the mountains. This arises from the fact that curves of much smaller radius may be adopted on a narrow gauge than are possible on a broad gauge. It is necessary that the wheel base of a carriage—that is, the distance from axle to axle—should be at least twice the width of the gauge over which it is to run, otherwise the carriage gets an awkward, unsteady, wiggling motion, neither pleasant nor advantageous. Manifestly, the wheel-base of carriages on a 2 foot 9 inch gauge can be much shorter than a 4 foot 8½ inch gauge, and the carriages will pass, without any friction of the flanges of the wheels, round much sharper curves; the drag friction is reduced in a similar manner. Any one examining the wheels of a locomotive or truck on a railway of the "standard" gauge can not fail to see that, not only the soles but the flanges of the wheels are polished

by friction, making it plain that the flange friction, even in passing round the curves which are set out for their accommodation, is very great. On the Festiniog line, on the contrary, notwithstanding marvelously sharp and continually recurring curves, the trains glide along them with perfect ease, and the flanges of the wheels are positively rusted.

It is easy to see that this power to adopt curves of small radius gives the engineer of the narrow gauge railway an immense advantage in settling out his line. He may follow the course of a river or the contour of a mountain side with comparative ease. He may double out of the way of heavy gradients, long viaducts, deep cuttings, expensive tunnels, and wind his way to his desired terminus with a consequent saving which in some cases is enormous. In the case of the Festiniog Railway a careful survey has been made, and it has been found that to construct a 4 feet 8½ inch gauge line between the same points would cost just *eight times* as much as the present line did, and five and a half times as much as a line of 2 feet 9 inches gauge would have cost. I have already remarked upon the fact that though the line runs for all its course through rocky and irregular country, there is remarkably little filling, cutting and tunneling. A section, however, of the country through which a line of the "standard" gauge must pass (setting out the curves in due proportion to the existing ones), shows that these heavy items in the cost of construction would be multiplied to an astonishing extent.

It will be admitted, I think, that to have constructed a line of "standard" gauge in such a case as this would have been the extreme folly. In any case, be it remembered, it is only a question of degree: to spend £10,000 where £2,000 would furnish all that is required is foolish; to spend £4,000 where £2,000 would suffice is only a less degree of folly.

Promoters of railways and intending shareholders will do well to bear this in mind. I hope to show that narrow gauge railways offer other and yet greater advantages over those of broader gauge, but this alone, the vast difference in the cost of construction, is sufficient to settle the great question whether a railway shall pay or not. What that difference will be depends entirely upon the character of the country through which the railway passes. In a perfectly flat country the saving would be about a fourth; in an ordinary country from a third to a half; in an exceptionally rough country very considerably more; but in any case sufficient to turn the scales of profit and loss.

The general public, too, will do well to consider the same fact. I believe that in some cases where a narrow gauge line has been projected there has been an antagonistic feeling on the part of the people in the district through which it has been proposed that it should pass. Sharing the unfounded prejudices of some engineers, they have fancied that, in losing the broad gauge, they would be losing some advantage or other, which they can not define, and they have been indisposed to be content with what has been offered them. Such would see, I think—if they would fairly consider this question of the cost of construction—that it is not always a question of broad gauge or narrow gauge, but a question of railway or no railway. It need not take long to choose between the two.

No. 4—Paying Traffic and Non-paying Traffic.

In their report upon the best gauge for the railway extensions in India, Colonel Strachey,

Colonel Dickens and Mr. Rendel said that "the gauge selected should not only be narrow, but the narrowest which would combine convenience of transport for various kinds of goods and passengers with reasonable speed and with safety and economy in working." I think I have already said sufficient to show the soundness of their advice, since I have demonstrated that a narrow gauge railway may be constructed for about half the cost of a broad gauge line. But there is another reason, more forcible still, in favor of the adoption of the narrow gauge, viz: that the traffic can be worked upon it at much less expense. The cost of construction comes but once; the working expenses are continual, and, as such, should be watched with the utmost jealousy. Every addition to them is so much decrease of dividend to shareholders or so much increase of tariff to the public; every saving is so much clear profit to go into the pockets of one or the other, or more probably of both.

Whenever a load is conveyed on a vehicle there is of necessity a certain amount of non-paying weight hauled in addition to that which pays. Wagon and load may weigh, say, four tons; it is evident that it will be much more profitable to the carrier if the wagon weigh only one ton and the load three tons, than if the wagon weigh three tons and the load only one. In the one case the carrier earns three times as much as in the other, though the cost of haulage to himself is the same in both cases. Herein lies the great value of the narrow gauge system; it enables you to carry the goods consigned to you, which may be called the *paying* traffic, with a much less proportion of weight of rolling stock, which may be termed the *non paying* traffic, than is possible on the broad gauge; in other words, the carrying capacity of a wagon in proportion to its tare weight is much greater on a narrow than on a broad gauge, and the profit of the load is thereby greatly increased.

Before going minutely into this matter, however, let me point out that on a broad gauge railway wagons of the full carrying capacity which it ought to bear can never be put. It will be remembered that I said in a former letter that the rolling stock on a narrow gauge will be wider in proportion than it can be on a broad gauge, and that careful calculation had shown that a gauge 2 feet 9 inches or 3 feet is the broadest of which the capabilities can be made fully available. From his experience on the Festiniog line, Mr. Spooner has found the following proportions may safely be adopted in the construction of rolling stock: Width of trucks, 2½ times the gauge; depth 1½ times; length, 4½ times; wheel base, 2½ times.

On a 2 feet 9 inch gauge the dimensions of the rolling stock would therefore be as follows: Width of truck, 6 feet 2 inches; depth, 4 feet 1 inch; length 12 feet 4 inches; wheel base, 6 feet 10 inches.

The tare weight of such a truck would be two tons, its carrying capacity (reckoning it as loaded with coals at forty-three cubic feet to a ton) six tons, and the gross weight on each wheel would consequently be two tons. Now let us look at what would be the result if these same proportions were carried out in the rolling stock on a 4 feet 8½ inch gauge. The dimensions would then be as follows: Width of truck, 10 feet 7 inches; depth, 7 feet; length, 21 feet 2 inches; wheel base, 11 feet 9 inches.

The tare weight of such a truck would be no less than ten tons six hundred weight, and its proper load on the same calculation as before would be thirty-one tons, giving a gross

weight of upwards of ten tons to each wheel. On a 5 feet 6 inch gauge the gross weight on a wheel would be sixteen tons. What sort of axles, axle-boxes, wheels, rails and sleepers would be required to bear such enormous weights may be more readily imagined than calculated. Very wisely, the engineers of broad gauge lines have not availed themselves of the full capabilities of their gauge, and never will unless there should be a return of the days when there were giants on the earth. We may reasonably ask, however, Why go to the expense of laying down a gauge when, from the nature of things, you dare not put upon it such rolling stock as is in proportion to it? Is it not much more economical, much more in accordance with the dictates of common sense, to be content with a gauge the capabilities of which you can fully utilize?

But, putting this point aside, we come to the one with which I set out—that the carrying capacity of a wagon in proportion to its own weight is greater on a narrow gauge than on a broad gauge. That arises in this way: Given the weight which a wagon shall carry, the wider its floor area is, the heavier must be its construction—for a ton of materials, if spread out into a large surface, will not bear so much as if put into a smaller compass; for instance, the head stocks, cross bearers and diagonals between the side sills of a wagon or carriage must be increased in section in proportion to the distance apart of the sole bars, the flooring boards must be thicker, the axles, axle boxes and wheels must all be strengthened, and thus the whole vehicle becomes heavier. So great is this increase of weight in rolling stock in proportion to its increase in width, that calculation shows that while the proportion of paying weight to non-paying weight (exclusive of engine and tender) on a 2 feet 6 inch gauge railway may be taken as 2,986, or nearly three to one, the proportion on a 4 feet 8½ inch gauge railway is only 1,477, or not quite one and a half to one; assuming in both cases that the trains are loaded to their full capacity. Here, then, in conveying a given load, we have a clear saving on the narrow gauge of one-fifth in the cost of haulage. What reason can there possibly be why this extra twenty per cent of profit—for it is all clear gain—should not be secured and go into the pockets of the shareholders? The advocates of the broad gauge ought to bring forward more forcible arguments than they have yet done before they ask that such an advantage should be sacrificed.

Nor does the advantage end here. The calculation I have given is based on the supposition that the trains are loaded to their full carrying capacity—a thing which rarely or never happens. Let us suppose (and the supposition is within the actual state of things) that the trucks, instead of carrying their full load, carry only a quarter of it. We then have on the 2 feet 6 inch gauge two trucks, weighing together say two tons, carrying one and one-half tons of paying load instead of six tons; on the 4 feet 8½ inch gauge we have one, a truck weighing four tons carrying just the same, one and one-half tons, instead of six tons. In this case, we have, by the adoption of the narrow gauge, a clear saving of more than a third in the cost of haulage. When the wagons run empty, as some of them must in their return journeys, along the whole length of the line, the saving will be exactly half.

We may go a step further. If, as I have said, the full carrying capacity of the rolling

stock on a broad gauge railway is rarely or never utilized, there is no need to provide wagons of so great a capacity on the narrow gauge. If, for instance, the average *actual* load of a broad gauge wagon, instead of being six tons, is only one and a half tons, we shall be safe enough if we provide a wagon which will carry three tons; and this again largely reduces the proportion of non-paying to paying weight. Some reduction for the same reason might, of course, be made in the rolling stock for broad gauge lines; but, on account of the width of the platform, the reduction, as will be understood from what I have previously said, must be more limited.

Mr. Fairlie, C. E., in an interesting paper which he read last year before the British Association in Liverpool, gave an example on a large scale, which I can not do better than reproduce. He said that it was known and everywhere admitted that the proportion of non-paying to paying weight in passenger trains is as much as twenty-nine to one, and in goods trains, exclusive of minerals, as much as seven to one. Selecting the London & North-western Railway, the good management of which, he said, was universally allowed, he showed by a series of calculations that the goods traffic upon it, if carried upon a 3 feet gauge, might be conducted at *two-fifths* the expense which is now incurred. He had shown that the proportion of non-paying to paying weight in goods trains was as seven to one; but to make his argument thoroughly safe, Mr. Fairlie took it as only four to one. Reckoning the paying weight carried over the line as ten million tons per annum, the non-paying weight would then be forty million tons, and the total weight hauled would be fifty million tons. The wagons employed on the line average four tons in weight; therefore, taking the proportion named, they would carry one ton of paying weight each. The wagons for a 3 feet gauge average one ton in weight, and have a carrying capacity of three tons; it is evident, therefore, that they could carry the one ton each, for which four ton wagons are now employed.

The ten million tons of goods might be consequently carried by wagons of the same weight, that is, ten million tons, giving a gross weight of twenty million tons, or *two-fifths* of the weight now actually hauled. Either, then, the present traffic could be conducted at two-fifths the expense now incurred, or if sufficient traffic could be commanded, a 3 feet gauge would carry a paying load of twenty-five million tons as against the ten millions now carried, without increasing by one penny the cost of haulage and permanent way.

If the traffic on a well managed railway be conducted at two and a half times the cost which it need be, what must be the state of things on a badly managed line? There is little cause to wonder that some railways have failed to pay.

It may be asked how it comes that wagons, as a rule, carry so small a proportion of the weight which they are capable of carrying. It arises in a great measure from the necessity for quick despatch, which now almost universally exists. A station-master receives a consignment of goods, perhaps only the eighth part of a wagon load; he can not wait until other goods come in to make up a full load—he must send them off at once; so, as Mr. Fairlie says, the gallon measure goes off with only a pint in it; if a quart measure were at hand, it would surely carry it just as well. Where there is absence of competition, this compulsion to quick despatch will of course not be so great, and the wagons may be load-

ed more in accordance with their capacity, but in any case some loss will arise in this manner. Trains will run empty one way, and numerous circumstances will conspire to prevent the full carrying capacity of wagons from being utilized. In India, where there is an absence of competition, it is found that, on the average, the weight carried does not exceed one-fourth the weight of the truck employed to carry it.

Seeing that, of necessity, we must carry some proportion of non-paying load to that which is profitable, common sense tells us that we should make the proportion as small as possible. This the narrow gauge system enables us to do, and thus assures to us an enormous saving. How this fact affects the question of profit and loss in other matters I shall have occasion to show in my next letter.

Cincinnati & Michigan Railroad.

A Jacksonville correspondent of the *Cincinnati Gazette*, under date of June 9, says:

A large meeting of the citizens of Wayne township was held last evening in this place. John Weaver, Esq., was called to the chair, and Obed Spencer appointed secretary. Dr. J. B. Owsley, Joseph Kunkler, Samuel Shaffer, Gilbert Cox and John S. Pharis were chosen as committee on resolutions and correspondence. The meeting was addressed by C. C. Pomeroy Esq., of Chicago, Illinois, showing the importance of the railroad to Cincinnati, and the superior claims of the line to public attention. The people see the advantages of the road, and will spare no effort to secure it.

At the conclusion of the address the following resolutions were unanimously adopted:

WHEREAS, Learning that a railroad is proposed from Cincinnati, Ohio, to Hillsdale, Mich., and part of the route in progress of construction from Greenville, in Darke county, to Van Wert, Ohio, through the western tier of counties in Ohio; therefore,

Resolved, That we will use our best efforts to secure an extension of the line from Hamilton to Winchester, through Jacksonburg, and thence northward as direct as may be practicable to Greenville, in Darke county, Ohio, there making a connection with the line to Van Wert.

Resolved, That we are assured, by an engineer familiar with the route, and our own knowledge of the country, that the line will pass through a productive section of the State, much in need of a railroad, and that it can be cheaply built.

Resolved, That for the advancement of this enterprise we invite the attention of the business men of Cincinnati to it as one of great importance to her prosperity, affording more speedy facilities for the people to reach that market.

Resolved, That to Hamilton it will be of equal importance, her superior water power and manufacturing advantages making Hamilton to Cincinnati what Lowell is to Boston; that this road will be the natural channel for everything necessary to sustain a manufacturing population.

The Future of Railroad Travel in our City

The New York Railroad is to commence at a point near the City Hall, between Broadway and Chatham street, probably about Tryon row, the terminus of the new Brooklyn bridge. The trunk line will terminate at Houston or Bleecker street, between Broadway and the Bowery. It will then branch off east and

west. The eastern branch will run parallel to the Third avenue, between that and the East river. The western branch will cross Broadway at or near Houston street, and run between Seventh avenue and the North river to Kingsbridge. The trunk line from City Hall to Bleecker street and the eastern branch line thence to Eighty-fourth street will be first constructed. This portion of the work is expected to be completed by the latter part of next year.

The road is not to be constructed through any existing direct thoroughfare. It is to be built sufficiently high not to interfere with existing street traffic. To this end it will be elevated from 10 to 15 or 18 feet above the surface of the streets. At street crossings the road is to bridge the street sufficiently high to permit ordinary street cars, vehicles or passengers to pass under it. The materials are to be of the best possible kind. It is to run right through existing blocks of buildings, which are to be taken at a valuation, to be decided in the ordinary manner. The roadbed is to be sufficiently solid not to jar or shake adjacent buildings. To this end it is to be independent of all other structures. The roadbed may be sustained by earthwork, stone or masonry, iron or marble pillars, or in any other manner consistent with durability and safety. The land on the surface covered by the railroad may be occupied as stores and warehouses, and under these again storage vaults may be constructed.

The trunk and branch line will cut right through blocks of buildings for a width sufficient to afford space for four tracks—two up and two down. One set of tracks is to be devoted to way traffic, to accommodate passengers going short distances. The other tracks will be reserved for through trains from the City Hall or Bleecker street direct to Harlem and Kingsbridge. The speed on the quick through trains will be equal to the rate of ordinary locomotives, while the speed on the way trains will perhaps be only a little quicker than the present horse cars. The motive power may be steam, electricity, condensed air or any other that the directors may decide on.

Access to the railroad will be by means of stairs from the street to apartments or waiting rooms, which will be a little above the second floors of the houses and on a level with the cars. These waiting rooms will be located on every alternate block. A sufficient number of cars will be provided to afford seats to every passenger. Workmen's trains will be run to convey male and female operatives from one end of the city to the other for four or five cents each. The fare on other trains is limited to 15c, and will probably average 40c. All possible care will be taken to guard against accidents. The great drawback to the railroad is the liability to snow blockades in winter. But it is said that new mechanical arrangements will be employed to obviate this difficulty.

The new railroad promises to be incomparably better than any that have been devised. It will certainly be much pleasanter and more healthy to travel in the open air above or over the streets than fifteen or twenty feet under them. It interferes with no existing interests, and leaves the present street cars and stages at full liberty to run or not, as may be deemed more convenient and profitable by the public and the various companies.

The most important question, "Will the enterprise pay?" has been practically decided by the shrewd, keen capitalists who have identified themselves with the undertaking.

The cost of the real estate to be taken for the roadbed is estimated at \$6,000,000. The construction and equipment expenses are placed at \$15,000,000. It will be necessary to appropriate one-sixth of the real estate to depots, leaving the remainder to be rented for mercantile and other purposes. It is believed that a sufficient number of lots containing each a basement and first floor can be rented at \$800 a year each, to pay a dividend of 14 per cent. on the capital, with the aid of \$3,000,000 a year estimated income. If the capital invested be reduced to \$11,000,000, with a loan of \$10,000,000 secured on the bonds and real estate of the company, the dividends may amount to 21 per cent.

These expectations, however, are to be received with some grains of allowance. It is probable that the real estate may cost \$10,000,000 or \$12,000,000 in place of \$6,000,000 as estimated. It may be anticipated that all the people residing on the blocks which the railroad will traverse, will bring in bills for real or fancied damages. From the City Hall to Bleeker street and thence by branch lines on the east and west side of the city to Harlem and Kingsbridge is a distance of 15 miles. The right of way for this distance through the most populous parts of the city will cost an immense sum. Then again it will be three years before any dividends can be earned, and it may take several years before the increase of population will enable the road to be worked to its full dividend paying capacity. The stores, too, under the roadbed are not likely to be occupied as rapidly as the directors anticipate. Nevertheless, the work is a great one. It will pay and pay handsomely at no distant period, and its construction can not fail to impart a new impetus to the prosperity and resources of our city. Taken in connection with other pending improvements, it will render New York the finest and most convenient city in the world.

Cincinnati & Mackinaw Railroad.

The citizens of Greenville met at the Court House to hear the report of Mr. Pomeroy, in relation to the condition of the grade of the Cincinnati & Mackinaw Railroad. Mr. Pomeroy presented his report, which was as follows: *To F. McWhinney, A. Speice and others:*

Gentlemen:—In compliance with your instructions, I have passed over the old grade of the C & M R R., from Greenville to the town of Van Wert, making the necessary measurements to arrive approximately at the cost of placing the roadbed in fair condition to receive the superstructure. The following is the result:

RECAPITULATION.

Roadbed in Darke county.....	\$12,354
" Mercer "	6,558
" Van Wert "	9,437
Total.....	\$28,349
Cross ties in Darke county.....	\$17,100
" Mercer "	17,400
" Van Wert "	9,000
Total.....	\$43,500
Graud Total	\$71,849

The above estimate contemplates the rejection of all the old bridges, culverts, timber delivered, and cross ties. Should any of the rejected items, on a more careful inspection, be regarded as useful, it will be so much to deduct from the grand total. The old grade is in a very fair state of preservation, having suffered more from the indiscretion of the citizens than from the action of the weather.

Very respectfully,

PHINEAS POMEROY.

Responsibility of Express Companies.

An important decision, touching the responsibility of express companies, has been rendered in the United States Circuit Court of Alabama. The circumstances are these: The plaintiff, a merchant in Mobile, forwarded by the Southern Express Company, on the 26th day of May, 1866, the sum of \$5,000, to be delivered to one J. B. Alexander, a resident of New York city. For this he paid the ordinary charge of twenty-five cents for letters in stamped government envelopes, thus leading the employees of the Southern Express Company in the belief that it was but an ordinary business letter, having no declared value. The letter was carried by the Southern Express Company to Lynchburgh, Va., and was there transferred to the custody and care of the Adams Express Company, to be by it delivered to the person addressed in New York. The delivery clerk of this latter company, instead of performing his duty with the fidelity that usually characterized him, suspecting the letter to contain valuable contents, opened it, and filched the \$5,000, which he found in bills of large denominations. Complaint reaching the Adams Company of the non-delivery of the latter for Alexander, they set inquiries on foot, and ascertaining the delinquency of their clerk had him arrested and secured the greater part of the stolen funds. A failure to deliver the package to Alexander was considered good grounds for suit by St. John, who came upon the Southern Express Company. Judge Wood delivered the decision of the court at great length, during which he laid particular stress upon a provision in the Southern Express Company's receipts for money packages, which says "that this company is to forward the same to its agent nearest or most convenient to destination only, and then deliver the same to other parties, they to complete the transportation, such delivery to terminate all liability of this company for such packages." But this was only one point; there were others, but the principal one was that alluded to above, where the plaintiff, in order to save expense, forwarded the money in a letter sealed in the ordinary way, and not in a large envelope sealed at each corner and in the center with sealing wax, and having on the upper side not only the directions but the precise value of the contents.

Cheap Transportation.

The Chicago *Tribune* proposes to cheapen transportation and enrich capitalists by constructing a new double-track steel-rail road between New York and Chicago, which, it says, could be done for \$25,000,000, and would be profitable competing against lines with a nominal capital of \$75,000,000.

The *Tribune* does not yet know that competing lines increase freights instead of lowering them, unless both competing roads can run at a great profit. Vacillating schedules are the curse of honest commerce. Companies cannot be prevented from remunerating themselves for losses they sustain in a freight cutting war, afterwards. Merchants have learned this long ago.

The *Tribune* should also know that \$25,000,000 would never suffice to build and equip a railway between New York and Chicago, with all the now recognized necessities of the rail road system. One hundred thousand dollars a mile would not be an extravagant estimate of the complete cost of such a line. New

grand through lines are no longer to be built with iron, but with steel; nor of only two tracks, but with three. For such a road to compete successfully with those now existing, it must at least equal their condition, as that will be five years hence. Five years hence the Pennsylvania Railroad will have virtually three tracks, and in a good degree steel tracks, the whole way. When its low grade, slow freight (Jefferson county) track is laid down, which will be in a year or two, it will be as much ahead of what it is itself now, as now it is ahead of its competitors.

There seems to be no good reason for the disturbance among the New York newspapers about the lease of the New Jersey companies' lines, such as the following, from the New York *Democrat*:

The control of the New Jersey railroads adds immensely to the already overgrown power of the Pennsylvania Railroad Company, and affords another remarkable illustration of the irresistible tendency toward railroad centralization. The Pennsylvania Railroad Company, with a line only 480 miles long, now owns or controls connecting lines nearly 5,000 miles long. It recently swallowed the Union Pacific Railroad, and it now annexes the New Jersey lines. It has established through connections with and controls the trade between St. Louis, Louisville, Cincinnati, Chicago, Omaha, San Francisco and the Atlantic ports of Philadelphia and New York, and it will soon own the direct lines to New Orleans and all the chief cities of the South.

What is good for Philadelphia is good for New York, since the relations of commerce are chiefly maintained by invisible laws which recognize no personalities. City jealousies are always mean things, and only entertained by the meaner sorts of citizens. Philadelphians ought to be thankful that they have two seaports, three in fact, at their command instead of one. And New Yorkers ought to thank their stars that they have a million of neighbors only a hundred miles away who are industrious, rich and enterprising enough, not only to fill their markets with dainties, and their shops with goods, but to build for them the best and cheapest avenue they have to the great West.—*R. R. Review.*

Good News for Tourists.

"G L C," the New York correspondent of the *Toledo Commercial*, says in a recent letter:

"The preparations for summer travel are already beginning. The railway companies are going to offer tremendous inducements to excursionists this year—greater than ever before. The new fast time table goes into effect on all the great trunk lines on the 15th inst., and it is calculated to run through from New York to Chicago even an hour or two quicker than by the famous lightning time of last year. Another new feature this season will be the throwing open to travel of the newly completed Niagara Falls division of the Erie Railway, which is destined to open a new phase of excursion travel to that delightful spot, by enabling passengers to leave New York after breakfast in the morning, and go through to Niagara Falls by daylight, reaching there in time for supper. This may seem wonderful at first sight, but remember we are living in an age of successive wonders. Yet one can not avoid a little start of surprise at the wonderful improvement in modern excursion travel, which enables a tourist to take his seat

after breakfast any morning in one of those recently constructed palace coaches, the Queen City, the Crescent City, the Jay Gould, or the James Fisk, Jr. (each costing upwards of \$25,000), and to be whirled at the rate of thirty miles an hour past a panorama of ever-changing beauty, to the Canadian border, reaching there in season for a good supper and a quiet smoke before bedtime.

"And for the convenience, too, of travelers from the West, passing through Buffalo from the Lake Shore route, yet desiring to view Niagara Falls, *en passant*, the Erie Company have determined to issue, free of charge, to all such, tickets from Buffalo to Niagara Falls and return, thus affording an opportunity to visit without extra cost this grandest of natural wonders."

THE ALABAMA AND CHATTANOOGA RAILROAD. SERIOUS RIOT AMONG UNPAID LABORERS.—Nashville, May 14.—Much excitement is reported in Chattanooga by passengers from that place, occasioned by the seizure of trains on the Alabama and Chattanooga railroad and stopping them by a mob of unpaid employes. The stopping of trains prevents the transportation of supplies to the other employes on the line, who are in a state of starvation. Business houses in Chattanooga are closed, fearing a mob. Stanton, the builder of the road, avers that he is not to blame for this state of affairs; that, if let alone, he can pay out. The Chinese employes demand to be sent back to California, willing to abandon their claims.

Chattanooga, June 14.—A committee of creditors of the Chattanooga and Alabama railroad company, after a consultation with Stanton, recommending resistance by all lawful means the present movement to put the road into bankruptcy, that Stanton be appointed to operate the road and a financial agent selected to receive and disburse all the income. That the debts due to the laborers and employes be paid first, that a full examination be made of the actual situation of the road and its present indebtedness, and that an extension of one, two and three years, with interest at eight per cent, be granted Stanton, in whose honesty and ability to pay every dollar of the debt they express full confidence.

RAILROAD CONTRACT RATIFIED.—At meetings held yesterday of the Marietta and Cincinnati, and Cincinnati and Baltimore Railroad Boards, the contract with the Cincinnati and Springfield Short Line Railroad Company, giving the latter the use of the new road, in from Spring Grove Junction, was formally agreed to on the following terms: The Cincinnati and Springfield Short Line Company to pay \$35,000 per annum until the double track shall be completed, within three years, then \$40,000 per annum for five years, and ever after that \$45,000 per year. And, as stated some time since, the Cincinnati and Springfield Company take \$100,000 of the first mortgage bonds of the Cincinnati and Baltimore Company. Furthermore, \$35,000 per annum of the lease money named above is to be guaranteed toward the payment of the interest on the \$500,000 issue of bonds by the Cincinnati and Baltimore Company. We understand that the stock of the Cincinnati and Baltimore Company has been taken with the exception of about \$135,000.

Movement of Ores.

The report of the State Mineralogist of Nevada for the two years ending with 1870, gives statistics showing the amount of ores and metal shipped from Eastern Nevada by railroad in 1869 and 1870. The figures for 1870 close with the month of November. During the entire period it is worthy of note that only 3,885 pounds of ore was shipped eastward. The shipment of ores to California during the two years was as follows:

	1869 Pounds.	1870. Pounds
January-----	12 186	764,707
February-----	14 796	404,788
March-----	36,000	797,641
April-----	299,266	1,018,303
May-----	100,848	919,327
June-----	178,656	960,262
July-----	173,010	1,331,190
August-----	182 717	1,280 845
September-----	245,620	987,182
October-----	352,037	2 066,771
November-----	724,837	1,556,593
December-----	627,662	-----
Total-----	2,947,535	12,030,609

These figures show two interesting facts:

First, that about all the ores shipped from Eastern Nevada for reduction comes to California, either to be worked in San Francisco, or to be shipped thence to England. The largest portion of the ores have been shipped from this country at a cost of about \$12 a ton for freight and handling, after reaching San Francisco. The other fact is that the increase in the yield of the mines of Eastern Nevada since the opening of the railroad, and the consequent facilities for shipment, has been nearly 600 per cent. In fact, scarcely any of the mines in that region could have been worked without the facilities for getting the ores to market afforded by the railroad. It will be seen that in twenty-three months 9,489 tons of ore was shipped. This ore was worth on an average at least \$100 per ton, or in the aggregate \$948,900.

In addition to the above, there was shipped from Eastern Nevada metal (lead and silver extracted from base metal ores) as follows, in 1870:

	Shipped. West, lbs.	Shipped. East, lbs
January-----	119,247	-----
February-----	320 651	-----
March-----	182 782	225,937
April-----	92 257	336,794
May-----	191,346	382,867
June-----	278,246	920,803
July-----	307,967	777,340
August-----	582,700	477,243
September-----	446,490	62,183
October-----	309,728	482 994
November-----	974,070	263,828
In 1869-----	102,485	-----
Total-----	3,907 969	3,929,431

Here we have 3,918½ tons of metal shipped last year, worth about \$250 per ton on the average, and, in the aggregate, \$979,625. The production of metal did not commence until the latter part of 1869, and that, as well as the shipment of ores, could not have been attempted without railroad facilities. The increase in the shipment of metals, it will be seen, has been great, going from 119,247 pounds in January, up to over 1,200,000 pounds in November. It will also be noticed that while the shipments in this direction have been constantly on the increase, shipments to the East since June have been diminishing, showing the cheapest and favorite route of shipment to be toward the Pacific coast.

We have no means at hand of knowing the amount of pure bullion shipped from Eastern Nevada since January, 1869. That probably would have been about the same had there been no railroad; so that the railroad has increased the yield of the mines in 23 months to the amount of ores and metal shipped, as follows:

Value of ore shipped-----	\$918,900
Value of metal shipped-----	979 625
Total-----	\$1,928 525

Or, in round numbers, \$2,000,000 added to the real wealth of the country, and the production increasing at the rate of from 300 to 400 per cent per annum.

As will be seen above, owing to the far cheaper rates of freight, the natural tendency of all this wealth is to move in this direction, but much of it—the greater portion—slips through our hands, and is lost to our local trade, because we have not provided proper reduction works for operating on the metals and the ores. Two or three first class reduction works in this city would get all the ores and metal they would be able to handle for the next half century. The railroad system has as yet only slightly tapped the mineral deposits of the interior. This year will show four times the yield noted above, and the next will manifest a still greater increase. Why does not Sacramento make an earnest effort to benefit itself, by handling a goodly portion of this wealth? There is no place on this coast so well adapted as is Sacramento for reduction works to handle ores and metals from the mines of Eastern Nevada and Utah.—*Chi. Jour. Com.*

BLOOD.—By the aid of a microscope it is seen that blood consists of minute round bodies floating in an opaline liquid; these are termed corpuscles. They are so very small that one cubic inch of blood contains no less than eight hundred million corpuscles. Blood is rather heavier than water, as is seen when a drop is let fall into the transparent liquid; it falls through it. In about fifteen minutes after blood is drawn from the body, it ceases to be fluid, and becomes a gelatinous mass. After standing for about twenty-four hours it separates into two distinct parts—one a watery fluid, which is called serum; the other, a solidified mass, coagulum. The red color of blood is due to a substance called hematin, which exists in the corpuscles. The coagulum consists in the main of a body called fibrin—flesh producer—masked by the color of the hematin. This fibrin differs but little from the nature of the white of an egg. The blood fills every office in the body by restoring and building it up. Certain matters are eliminated from the blood to produce hair, nails, skin, fat, muscle, bone, brain, etc. It is therefore obvious that the blood must be of a complex nature. As a single fluid, it contains more known elements than any other known natural body; among others may be mentioned phosphorus, lime, magnesia, iron, sulphur, soda, chlorine, potash, etc. In its natural condition it contains fat and sugar. The average composition of blood indicates that in every thousand parts from a male, it contains 780 of water; from a female, 790 of water.—*Septimus Piesse.*

Last year 33,739 immigrants arrived at Boston. In 1869 the number was 34,784.

There are already 2,500,000 mulberry trees in California, for the use of the silk worms, and more are constantly being planted.

California exported to Europe from July 1, 1870, to December 15, 1870, wheat valued at \$5,219,157.

ZINC WATER-PAINT.—The unpleasantness of occupying a newly painted house may readily be avoided by the use of zinc water-paint. Powdered oxide of zinc (which may be heated with a little potato starch, if more "body" be wanted) is combined with the desired mineral or vegetable color, and with this an aqueous solution of chloride of zinc, to which some tartrate of potassa has been added, is then mixed; the water-paint thus formed being applied with a brush on the surface to be coated. In half an hour this paint will be perfectly dry; and the object of the alkaline tartrate is to make the drying process less rapid. The advantages of using the water-paints are very numerous; they are more durable than oil paints, do not blacken by exposure to sulphurous vapors, are devoid of odor, dry quickly, resist dampness and the action of water, can be cleansed with boiling water and soap like oil paints, and preserve the wood to which they are applied from decay and render it less combustible. This latter property may be increased by the addition of borax. Both the oxide and the chloride of zinc can be manufactured without danger to the health of the workmen, sold at a low price and kept for any length of time in any climate.

CAMELS IN NEVADA.—About seventeen miles east of the city is to be seen a herd of twenty-six camels, all but two of which were born and raised in this State. They found no difficulty in rearing them, and can show twenty-four fine, healthy animals, all of Washoe growth. The camel may now be said to be thoroughly acclimated in this State. The ranch upon which they are kept is sandy and sterile in the extreme, yet the animals feast and keep fat on such prickly shrubs and bitter herbs as no other animal would touch. When left to themselves, their delight, after filling themselves with the coarse herbage of the desert, is to lie and roll in the hot sun. They are used in packing salt to the mills on the river, from the marshes lying in the desert, some sixty miles to the eastward. They have animals that easily pack 1,000 pounds.—*Virginia City Enterprise.*

COUNTING MACHINE.—A Norwegian inventor has invented an adding or counting machine, which, while it employs a familiar principle, varies in detail somewhat from others which have preceded it. It uses keys movable on a horizontal axle, one key for each number from 0 to 9; also mechanism transferring the pressure from these keys to the dial plates, so as to indicate the number corresponding with the key; also mechanism by which the tens and hundreds are transferred to the succeeding numerical series. It will be seen by those familiar with the subject that no new principle is involved in the construction of the machine. The details are, however, so worked out that the machine is said to be much more convenient than those that have preceded it.

A NEW MINERAL BLUE.—A new mineral blue has recently been patented in France, consisting of ten parts of tungstate of soda, eight parts of protochloride of tin, five of ferrocyanide of potassium, and of perchloride of iron. This new coloring matter is said to present the general appearance and physical characteristics of Berlin blue, but differs essentially, by its greater body and by its resistance to the action of the sun, maintaining its color in spite of continued exposure to the solar rays.

The commerce of Boston, says the *Traveler*, is increasing. Nearly fifty per cent. more foreign goods have been entered at that port since January 1st than in the same time last year.

The manufacture of spool cotton was commenced in the United States in 1854, at Willimantic, Conn. In 1863, the Hadley Company commenced in the Holyoke valley the manufacture of these goods, and in less than eighteen months had forced a complete revolution in the character of the cotton sold, by the superiority of the article they produced. Up to 1865, the finest grades of English six-cord spool were to No. 46. The perfection of the American article compelled all makers seeking to supply a family with spool cotton, to run their six-cord cottons up to No. 100. And now American ingenuity beats the world in a nine-cord cotton in the high numbers. The growing popularity of American cotton and thread in the workshops and factories, has crowded down the price of the English goods twenty five per cent., and American makers, to compete, hardly make two per cent. on their production. To secure honesty in this competition, Massachusetts and Rhode Island manufacturers have secured the enactment of a law in their respective States, making it a penal offense to ticket cotton differently from what it actually measures, or to copy other manufacturers' labels.

7-30 GOLD LOAN

OF THE

Northern Pacific Railroad

RAPID PROGRESS OF THE WORK.

The building of the Northern Pacific Railroad, (begun July last), is being pushed forward with great energy from both extremities of the line. Several thousand men are employed in Minnesota and on the Pacific coast. The grade is nearly completed 26½ miles westward from Lake Superior; trains are running over 130 miles of finished road and track laying is rapidly progressing toward the eastern border of Dakota. Including its purchase of the St. Paul & Pacific Road, the Northern Pacific Company now has 413 miles of completed road, and by September next this will be increased to at least 560.

A Good Investment. Jay Cooke & Co. are now selling, and unhesitatingly recommend as a profitable and perfectly safe investment, the First Mortgage Land Grant Bond of the Northern Pacific Railroad Company. They have 30 years to run, bear Seven and Three Tenths per cent. gold interest (more than 8 per cent. currency) and are secured by first and only mortgage on the ENTIRE ROAD AND ITS EQUIPMENTS, and also, as fast as the Road is completed on.

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Sinking Fund. The proceeds of all sales of Lands are required to be devoted to the repurchase and cancellation of the First Mortgage Bonds of the Company. The Land Grant of the Road exceeds Fifty Million Acres. This immense Sinking Fund will undoubtedly cancel the principal of the Company's bonded debt before it falls due. With their ample security and high rate of interest, there is no investment, accessible to the people, which is more PROFITABLE OR SAFE.

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Other Securities.—All marketable Stocks and Bonds will be received at their highest current price in exchange for Northern Pacific Seven-Thirties. Express charges on Money or Bonds received, and on Seven-Thirties sent in return, will be paid by the Financial Agents. Full information, maps, pamphlets, &c., can be obtained on application at any agency, or from the undersigned.

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The Railroad Record.

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WATER.

The question of the water supply of Cincinnati is still—like the water itself which the citizens are using—unsettled. There is one fact, however, that remains, and that is, that the citizens of Cincinnati are still drinking the same filthy decoction of stables, street washings, sewerage, and seepage from the vaults of East Walnut Hills, and the entire section of the city above the present works that they have been drinking for some years past.

There is one consolation, it is not done ignorantly. The Trustees of the Water Works have told us of it; the Board of Health have promulgated against it; the Mayor has "messed" against it; and the daily press have "editorialized" it, until all have lost their effect. Indeed, it is not thought of, except on special occasions, after a thunder storm or distillery fire, or some other disturbing element; even then it is soon forgotten, and we go on imbibing the vile compound, as poor Joe Myers said of it, "in all its peculiar freshness," without a "qualm" of conscience or of stomach.

But,

It is to be remedied. We are glad of that, will exclaim all humanitarians, and lovers of that attribute that is next to godliness.

This will be hailed by all as a step in the right direction, and perhaps the boon is so great that but few will enquire or care to ask after the manner of its coming.

It is, however, a subject of sufficient importance to justify the most diligent inquiry and the fullest investigation.

No plans or projects that may be presented for the accomplishment of this great result—the supply of *pure water* to Cincinnati—whether interested or disinterested—involving as this question does the outlay of millions of the people's money, and next to pure air, the most important element of health.

The purity, as well as the abundance of the water supply is important also to manufacturers who use it in steam boilers.

Our City Council, on Oct. 20th, 1864, very wisely took the matter under consideration, and appointed a commission "to take into consideration the best method of obtaining an abundant supply of pure and wholesome water for the city." They were "authorized to institute and carry out all requisite and preliminary surveys and investigations for ascertaining the most economical and practicable mode of supplying our city with pure water," etc. This duty was performed by the commission in the most common sense method, not by undertaking to do themselves what they knew nothing about, but by the employment of a competent person to do the work for them.

The commission selected James P. Kirkwood, of Brooklyn, N. Y., after an elaborate canvassing of the reputation of the leading engineers of this country, to make the investigation and report.

THE RESULT.

The commission instructed Mr. Kirkwood, and, "not wishing to limit him in time or expense, or spare any pains in making the most searching investigation," he made perfect surveys of all suggested plans of obtaining water by gravitation, either from streams or by gathering grounds to collect into lakes the rainfall. The commission, however, finally remark that "We regard the question, therefore, as to the source of supply for our city as definitely settled for all time, and that the Ohio river is the only means from whence this city shall derive her supply of water."

This problem being determined, the next questions to solve are where to locate the works, the character of the works to be erected or constructed, and their extent or capacity.

Less than a decade in the history of our city has changed if not the individual opinions of the commission, the public sentiment, at least, in reference to the location of the proposed new works. The commission say: "The location [Crawfish creek] of the works, as made by Mr. Kirkwood, are as high up the river as can well be obtained without crossing the Little Miami, which we do not think worth while to advocate now. Perhaps fifty or a hundred years hence the extensions of the city may be such as will demand the then city authorities to carry their works beyond the Miami river, and locate the reservoir on the hills east of that stream, and even then the reservoir, as now proposed, will doubtless be retained as part of the system for supplying the city with water."

Notwithstanding the ability of the commission, and the high professional attainments and character of their engineer, this plan was abandoned, and the "Garden of Eden" instituted.

Against this, we have not one word to say; except that it is now determined—by the Water Works Board, by the Board of Health, by the City Council, and by the *vox populi*—that the source of the supply must be above the mouth of the Little Miami.

Nevertheless, in the language of the commission, "even then the reservoir [Garden of Eden] as now proposed [being constructed], will doubtless be retained as part of the system for supplying the city with water."

How clearly and with what precision the commission foretold the "coming" method. No error committed, except as to the time required for its development—their "fifty or one hundred years" being condensed into SIX years.

It is evident that the world moves—advances. The water is to be obtained from an uncontaminated source—above the mouth of Five Mile creek, on the Ohio side of the river. "So far, so good!"

"ONE THING YET THOU LACKEST!"

What is that? Why the very essence or gist of the whole matter! Pure water.

How can that be? Why, we thought if the water was obtained above the mouth of the Miami, we should escape all city sewerage and the other abominations alluded to!

True.

But let us refer to the report of the commission again.

PURE WATER.

They say: "The water as now obtained from the river, a large portion of the year, needs filtering to render it clear and free from the sedimentary matter held in solution."

They scarcely need to have told us that—everybody knows it. Surely there should be no controversy on this point. There is, however,—and the Ohio river water is to be pumped into our *cuisines* and stomachs, as heretofore, with "all its peculiar freshness," varied only by standing a few hours longer in the Garden of Eden!

THE REMEDY.

Mr. Kirkwood says there are two ways of doing it, and as the commission—remember it was *our* commission—paid him liberally, we ought, and have a right, to make the best possible use of the information which he gives us. He says:

FIRST.—FILTRATION.

"The greater the amount of sediment carried by a river, the longer must be the time given it to deposit the coarser portions of this sediment, before placing the water in the filter bed. The water can always be reduced in this way to a condition which shall make the filtering process successful, and render it, finally, clear and limpid."

This has been entirely omitted in the calcu-

ations of the promoters of the present project to supply Cincinnati with *pure water*!

SECOND—SEDIMENTATION.

Mr. Kirkwood further says:

"I desire to repeat here that the filtering bed is not necessary except as an economizer of time and space. With large reservoirs of deposit, of capacity to admit of the water *lying still*, under its worst conditions, from ten to twenty days, they would not probably be necessary."

THE ONLY REMAINING QUESTION

Is, can either of these plans of furnishing *pure water* be successfully carried out by the project recently promulgated by the Water Works board and their engineer? If not, why then we will have failed of our purpose, and our money wasted! The water of the Ohio river would not be *pure* unless either *filtered* or *sedimented*. Is this necessary? The highest talent of the country says it is! While those to whom "we are tying," leave us to *infer* that it is not. Both plans involve a cost of between two and three millions. With the one we get what we want—*pure water*—with the other we don't! It is for the citizens to say—"you pays your money, and you takes your choice."

IT CAN BE DONE

By going to Kentucky! In the hills of Campbell county are landlocked basins, a series of them, in the language of one of our Trustees, "made by the Almighty on purpose for reservoirs for Cincinnati!"

They can be had, and either or both the plans suggested by Kirkwood fully carried out, and nothing but the *purest water* ever be furnished to the distributing reservoirs. All the necessary legislation has been obtained, with the approval of the Trustees. There are neither legal nor physical obstacles in the way. Neither would

THE COST

Exceed that proposed for the inefficient scheme contemplated; and if it did, in the language of the *commission*, we think "that an *abundant* supply of *pure water* is worthy of almost any expenditure of energy and means."

The construction of a new water works and the expenditure of near three millions of dollars for them is a serious matter. It is not a work for to-day, neither will the present tax payers pay for it. The work is for the future, and the future will be made to pay the cost. Bonds will be issued to meet the liability. We are, therefore, in duty bound, in making the expenditure, to have a due regard for the wants and necessities of those whose money we propose to expend. Hence, if there is not sufficient breadth of comprehension as to the wants and necessities of the future on the part of those who have the charge of this matter, let them have the good sense of the *commission*, and employ some one who has. We shall then not only be acting with common sense, but with justice towards those who will have to liquidate the debt. *Let all plans be examined, and the best adopted.*

Apaches.

The outrages of the Apache Indians in Arizona, New Mexico, Sonora and Chihuahua (the two latter States being in Mexican territory, and for which we are, by treaty, responsible), has been a crying evil for many years. Despicable in numbers, cowardly in demeanor, yet audacious in their rapacity, cunning and treacherous, and without a single instinct indicative of humanity that is not possessed in common with the wolf, they have become a nuisance and a stench on the face of the earth, and should be removed.

This is not a new position with us. It is one that we have long occupied and defended in the RECORD. We are glad to learn that Gen. Crook thinks he can carry it out.

We still believe, as we have often before stated, that there is a cheaper, better, and more efficient way of doing it. But then who ever heard of Government adopting anything different to their own way of doing things. The Government method is to send white troops to hunt the Indians in their mountain fastnesses; in many instances in localities where the feet of white men have never yet trod. The Government usually sends cavalry—on foot.

The Indians are well mounted, admirably appointed in their accoutrements by the fostering care of the Government, and are familiar with every by-path, short-cut and hiding-place in their country.

White troops may and will succeed in capturing and killing a few, but it is next to impossible for them to tree them or to follow them to their holes and drag them out.

The construction of the Southern Pacific Railroad, so wisely provided for by the Government, when building and built, will do more than the troops towards extinguishing this pest.

There is, however, another method, that we have previously suggested in the RECORD, that is, to let "dog eat dog," that can be employed more cheaply and efficiently than the present system.

There is a numerous tribe of Indians in Arizona known as the Papagos. They are peaceable, industrious, sober, thrifty (for Indians), have always been friendly to the whites, brave, familiar with the habits and haunts of the Apaches, have always whipped them in every contest, and with a mortal hatred of all the Apache family. Upon the entire western coast these people are the most truthful and virtuous, and we doubt if any Christian community preserves with greater care, female chastity.

The Papagos have never been cared for by Government; they have never needed it. They have been good Indians, and therefore did not deserve any presents or encouragement.

Nevertheless, we can see no good reason

why they should not be employed by contract to extinguish the Arabs—or hell-hounds—of the American continent, the Apache Indians.

We say they can do it cheaper and better than it can be done by white men. Why not let them try it? at any rate as auxiliaries, if not on an independent and separate contract. We prefer the latter, it will not cost one quarter as much.

Gen. John C Breckenridge, F. K. Hunt, Esq., of Fayette county, and Judge Simpson, of Clark county, were elected the Kentucky directors of the Lexington & Big Sandy Railroad. The other six directors were New York parties interested in the Chesapeake & Ohio Railroad.

The city council of Maysville (Ky.) proposes to contribute towards the construction of a railroad to Flemingsburg.

TUNNELS UNDER BALTIMORE—The difficulty and expense attendant upon the transmission of freight and passengers across the city of Baltimore, between the termini of the various roads on the north and south, has been such as to demand some remedy. The war between the Pennsylvania Railroad Company and the Baltimore & Ohio road determined the former company to construct a route of its own to Washington and, by securing further connections, lately effected, to the South. To accomplish this, the Baltimore & Potomac Railroad is being built, and affords a direct route from Chicago via Pittsburg and Harrisburg, the Fort Wayne, Pennsylvania, and Northern Central being the roads used to Baltimore and Washington. This road has projected a tunnel of 7,400 feet in length to pass under the city of Baltimore from the terminus of the Northern Central Railway. The work will cost \$1,250,000, and is wholly built in the interest of the Pennsylvania Railroad, which thus opens an independent line to Washington, Richmond and the whole South, with an ultimate connection and control of the Southern Pacific road. The contract for this tunnel has been let to Thomas Ritter, of Philadelphia.

Another tunnel is proposed, and bids for it sought, extending some 3,400 feet underground, with a surface road also. This is styled the Union tunnel, and runs from Belvidere bridge to tidewater at Canton. The cost will be from \$800,000 to \$1,000,000. The road and tunnel, not over three miles in length will be used by five other roads, the Northern Central, Baltimore & Potomac, Philadelphia, Wilmington & Baltimore, Western Maryland, and Baltimore & Ohio, to all which it affords transit through Baltimore, and connection with the several roads named. It is owned and built, principally, by the Canton company, to whose wharves it extends, and can not fail to be highly profitable. Certain restrictions in the charter secure to all roads connecting the right to its use on payment of certain stipulated tolls. Work is to be commenced at once on both tunnels and vigorously pushed to completion. The result is looked upon as highly advantageous to the city of Baltimore, and particularly to the Canton company. A Philadelphia contractor has also obtained the Union tunnel, the expenditure on the two being over \$2,000,000.

New Jersey Railroad.

ANNUAL MEETING AT JERSEY CITY—APPROVAL OF THE LEASE.

The annual meeting of the stockholders of the New Jersey Railroad Company was held in their office in Jersey City on the 7th inst., with a very large attendance of stockholders, as it was understood that the proposed lease of the road to the Pennsylvania Central would be discussed. Much interest was also manifested in consequence of a rumor that a change would be made in the board of directors by the removal of Messrs. Gregory, Howell and Perry who were understood to oppose the lease. The meeting organized with the following officers: John K. Ford, of New Brunswick, chairman; R. W. Stites, of Morristown, and Col. John Kean, of Elizabeth, vice do.; H. J. Southmayd and John P. Jackson, secretaries.

After some preliminary business, Mr. Ashbel P. Welsh, the general president of the joint companies, made a statement as follows:

Gentlemen:—As you already know, a negotiation has been made with the Pennsylvania Railroad Company for the lease to them of your canal, railroads, property and franchises for 99 years, at such rent as will give you a clear annual dividend of ten per cent. on your stock. The acceptance or rejection of this offer belongs not to your representatives, but to you alone. I have, therefore, aided in the preparations to bring the question before you, as well as in securing such provisions as most effectually to protect your interests; scrupulously avoiding myself, and as far as possible preventing in others, any action or public expression tending to take the decision out of your hands. I have also advised officers and employees not to mingle in the conflict about the lease, since it has come before the stockholders; as any hostility incurred by them as partisans, impairs their usefulness as officers.

When it was proposed that the board of directors should express their opinion in favor of the lease, I opposed it—partly because I thought the property worth more than we were to get for it, and partly because I thought it was not a question for the directors, but for the stockholders only.

But the board having spoken and acted, their presiding officer is not at liberty to speak or act on the subject disposed of.

As this lease will probably be ratified by the stockholders, and it is not probable that I shall again have the honor of addressing you, I take this occasion to say a few words about the policy which the present administration has pursued since the consolidation of these companies.

This policy has been to make the avenues of traffic between the two great cities of this continent—the main trunk through which the traffic of the South and South-west seeks the commercial metropolis—fully adequate to their purpose; to make them perform all the duties of their location; to do this at the least possible expense; to end the thirty years' war between some of the companies and the public; to guard against competition, or to make competition harmless, by the sufficiency and superiority of our facilities and the moderation of our rates, and consequent increase of business; and to continue to show that, if corporations have no souls, they may have integrity and honor; and by all these means to add greatly to the amount, and especially to the certainty of your dividends.

Of course the increase of facilities required a large increase of investment. This was not only wise, but unavoidable. Our railroads were calculated for a small high-priced business, and in that state of things the threatened competition, prevented only by our improvements, would have been ruinous. The aim was to prepare for and develop a heavy business which could be but little affected by competition.

Though our increase of investment is great, though some of the expenditures have not yet had time to become productive, though the work and materials used in the maintenance and operation of our roads have been from 60 to 80 per cent. higher than before the war, though the public demands for more luxurious accommodations have added greatly to our expenses, and though many of the rates have been very much reduced, yet the percentage of profits now made on the whole enlarged investment of our four companies is not greatly different from the percentage on the former small investment. The greater proportion of stock receiving 10 per cent. to debt receiving 6 per cent., and the great increase of taxation, the gold premiums, &c., have prevented this equality from appearing in the dividend fund. The United States taxes since the consolidation have averaged something like one and a half per cent. on our stock more than they probably will hereafter, and our works, run down at the close of the war, are now in better condition than ever before.

Mr. Welsh then proceeded to state the embarrassments of their roads, showing that they were never intended for the heavy freight traffic at cheap rates, upon which other successful roads depend. The old system of transit duties also absorbed all the profits, and since they were abolished, four years ago, the tonnage had trebled. But a great difficulty remained—the want of a terminus and storage facilities on the Hudson, for if taken at once to New York, the extra ferrage, cartage, storage and handling would cost as much as hauling over 200 miles of railroad.

To supply this want the Harsimus cove was purchased, and it is to reach this seventy acres now flowed by the tide that the Pennsylvania company offer to lease our works at ten per cent. This improvement involved such expenses (\$3,000,000) that it has been postponed to this time. If we had made the improvement at once, we should probably now get twelve per cent., instead of ten, and could have carried out more fully our liberal policy. Mr. Welsh concluded as follows:

Should the lease fail from any cause, we can not stand still. We should lose no time in making this improvement; making it ourselves—not in connection with anybody else, but retaining all the power it confers.

Then, with our unequalled location, our ramifications among the sources of business, manufactories stimulated by low freights and favorable locations springing up along our route, the business of the South reviving, and that of the whole country growing, with legal trammels now removed and valuable rights obtained; we opening our doors to all connecting lines and all other parties on fair and equal terms, and giving them assurance for the future by permanent contracts; lifting ourselves out of any old grooves that no longer run in the right direction; adopting a single simple organization in place of the present provisional government; shunning the tainted air of legislative ante-chambers; then—we do this—if the lease falls through, we shall have little reason to regret the failure.

Mr. P. S. Duryee, from a committee appointed at the last meeting, reported that a plan had been prepared for consolidation of the four companies, and a reduction of the expenses, by the appointment of one set of officers, etc. The proposed lease was also considered, and it appeared more feasible to a majority of the committee as a method to accomplish a closer consolidation, and more certain and satisfactory dividends.

Col. Black, of Burlington, stated that he was opposed to the lease. He thought we should get 15 instead of 10 per cent. The Pennsylvania Central Railroad with a debt of \$20,000,000 was grasping everything; they went north, south and to the Pacific, and now want to swallow us up. In Philadelphia we could not be heard, but we have a voice here. This company want to rule the country; they have now about \$40,000,000, and want \$20,000,000 more, or about one-twentieth as much as the debt of the United States. They want to be our masters, to make us their vassals, and bind us to the car of Juggernaut. They ask to bind us for 1,000 years, or thirty generations. Where will be our country then? On financial considerations, we should have at least 15 per cent.; but let this lease be made and we may be sold out at any time. Don't put us in the power of the Anaconda, and have us strangled in its folds. He trusted this lease would be carefully considered, and that we would not accomplish this iniquitous scheme of giving away our power to a usurper. Col. Black spoke at length on the failure of the Pennsylvania Central company to give in any satisfactory statement of their affairs, and also intimated that our own directors were concealing something.

Mr. D. A. Hayes, of Newark, thought the charges of deception were of a remarkable character. He thought our managers were honest and fair-dealing men.

Mr. John G. Stevens said we had four corporations all under independent management, but united in their interests. If this lease is not made, he thought the proposed centralization would be desirable. The allegation of Mr. Black appears to arise from a conversation with Mr. Gatzmer, who only spoke for himself, and who, it is well known, was not only opposing the lease but also employed counsel to that end. He protested against the company being made responsible for Mr. Gatzmer's personal conduct.

Mr. Duryee said general assertions were easily made, but take the property of the company throughout the road, and can we work it so as to get 10 per cent. out of it? Rich men, who have plenty of money, may say run the road and get only 6 per cent., but those of us who depend on 10 per cent. for our living, look at it in another light. We hear of indifference to competition. Why look at our Newark traffic? Who thought, after the building of the Morris road, that another road to New York would be built, costing more than the entire cost of our road from New York to the Raritan, and although run at the cost of the Central Railroad, was a material loss to us? What we want is dividends.

Mr. Daniel Dodd protested against this desultory discussion.

Mr. Duryee offered a resolution that this meeting endorse the action of the joint board in arranging a lease to the Pennsylvania Central Railroad by which we will be guaranteed 10 per cent.

On motion correspondence was read between Mr. Black and Mr. Gatzmer, in reference to the affairs of the company—Mr. B. making many inquiries into the affairs of the

company, and receiving an answer in general terms.

Mr. Voorhees said Mr. Black should remember that Mr. Gatzmer had a salary of \$8,000.

A motion to lay the resolution on the table was lost.

Mr. D. Dodd, of Newark, said this development of Mr. Black was to his mind a strong argument in favor of the consolidation. There are four or five different companies under different managements. The question for us is where can we get ten per cent. Our statement of last year shows that our earnings were only 6½ per cent. instead of 10. If we improve Harsimus cove, we must spend \$3,000,000, and where is this money to come from unless we can pay the interest on it. If the Pennsylvania Central with its thousands of miles of connections, can only earn 6½ per cent. they may be able to pay us 10 per cent. to attain our facilities. If we do not take up the offer, Mr. Dodd doubted not that another road (the N. J. Central) might give them inducements to locate within 1,000 feet of our line. They are bound to have an outlet to New York, and if we do not give it, then somebody else will.

Mr. Mahlon Runyon, of New Brunswick, asked what remedy we had if the Pennsylvania Central should fail to pay the 10 per cent., and how can we recover?

Mr. I. W. Scudder said the remedy is twofold—one by re-entering, and the other by the covenant in the lease.

Mr. Hayes thought a bird in the hand was worth two in the bush. The Pennsylvania Central, if they could not get our road, would have some other. [A stockholder—that's a bugbear.] Gentlemen may call it a bugbear, but so it was said of the Newark & New York Railroad, which we might have prevented, and did not; and that cost us over \$200,000 per year, and is increasing. The Morris & Essex Railroad Company embraced the offer of the Delaware, Lackawanna & Western Railroad to prevent opposition, and experience showed the wisdom of it. There were other roads which could be obtained, and the Pennsylvania Central would secure one. Now let us make sure of our 10 per cent. and accept our lease.

Mr. Duryee said the whole thing resolved itself into this: Shall we refuse this lease and be content with seven per cent., or shall we accept it with ten per cent.? Shall our stock be worth only par, or shall it stand at 130, to which it has risen from 117 since the lease was proposed? Harsimus cove has lain idle for three years and \$3,000,000 is wanted for its improvement; can we spend that and pay ten per cent.?

The resolution of Mr. Duryee approving the lease was then carried by a large majority.

The polls were then opened, and the following gentlemen were elected directors: Dudley S. Gregory, Henry R. Remsen, Hamilton Fish, Alfred L. Dennis, George R. Chetwood, Martin A. Howell, Ferdinand Suydam, Nehemiah Perry, Isaac W. Scudder.

The vote was as follows:

Whole number of shares.....	72,952
Whole number of votes.....	43,817
Gregory.....	42,771
Remsen.....	43,817
Fish.....	43,817
Dennis.....	43,818
Chetwood.....	43,817
Howell.....	43,748
Suydam.....	43,817
Perry.....	42,840
Scudder.....	43,817

Messrs. Howell, Gregory and Perry, who had been opposed to the lease, were re-elected without much opposition, the decisive vote endorsing the lease being regarded as suffi-

cient to warrant their official endorsement of it, aside from their personal views.

After the meeting, the company took their usual excursion on one of the ferry boats of the company, which had been handsomely fitted up for the occasion.

Railway Safety.

THE BLOCK SYSTEM IN ENGLAND.

Mr. Alfred Watkins, an English railway superintendent, has published a pamphlet in which he thus describes the "block system" of signaling in use on the South-eastern Railway, "a plan so efficient," says *The Economist*, "that for three years it has enabled that railway to be almost alone in its exemption from even minor casualties."

The true objects to be attained in unimpeachable train signaling are—I presume to consider—first, that no train shall be allowed to leave one signal station until that signal station has asked leave from the signal station in advance, and such second signal station has replied in the affirmative; second, that when the train has been so allowed to leave, the sending station shall inform the receiving station that the train has left, and the receiving station shall acknowledge that he has been so informed; third, that the signals of danger shall not be lowered until this process has been gone through; fourth, that a record, taken down at the moment, shall be kept in each signal box of the time of all signals.

These four conditions complied with will secure safety from collision so far as it can be secured by human agency. These conditions can only be realized in our modern practice by the use of the telegraph and the absolute "block" system. They are, and have long since been, realized on every part of the South-eastern system. I know of no other railways where the whole of the system is in application, except on the South-eastern, and London, Chatham & Dover. These two railways had no accidents to report last year, whereas the greatest and most prosperous of our railways—the London & North-western, Lancashire & Yorkshire, and North-eastern—contributed 64 out of the 122 accidents which disfigured the railway calendar of the whole empire. Again, an electrical means of communication—electrical because in no other way can an instantaneous and certain signal or message be conveyed—should be established in the case of trains running long distances, between the driver and the guard. I now proceed to describe the system by which the four essential conditions which I have laid down are and have been secured: On the South-eastern, the personnel of the signal box, or station, consists not merely of the "ministering," but also of the "recording" angel. The signaller, specially selected for intelligence, and paid good wages, is accompanied by a youth who must understand, having been carefully taught, the use of the telegraph signal and speaking instruments; who records, with the clock before him, the exact time of all signals given and received.

The signal box is specially constructed, and placed so as to give a full view of the line and outside signals. It is made comfortable and warm; it is well lighted at night; it contains a clock, the telegraph instruments, the levers of the points, connected with the signals by the "locking" apparatus, and is furnished with a box of fog signals, and with hand signal lamp and signal flags.

Baltimore & Ohio Terminal Facilities and Ocean Lines.

Among notable points visited during a recent sojourn at Baltimore, was the great terminal station of the Baltimore & Ohio road at Locust Point. The company have here twenty-seven acres of water front. From its docks one European steamer departs and another arrives each week. There are no fewer than fifty vessels, regularly engaged in the Atlantic coast trade, which take and discharge their cargoes here. Of these, there are always three or four, and often eight or ten ships loading for foreign ports; and often four or five discharging. One can form no conception, except from observation, of the great variety and immense aggregate of freight handled. Not to mention ordinary articles, such as grain, tobacco, etc.—the well known New York house of Phelps, Dodge & Co. import and receive here 30,000 boxes of tin each week, making this the exclusive depot for the accommodation of their Western and South-western trade. The oil-cake (export) trade here amounts to 30,000 tons per year, all by foreign vessels. From these docks, too, the excellent coal obtained along the line of the B. & O. road (mainly at Piedmont and Cumberland) is loaded into canal boats, which go to Buffalo "without change," and not less notable, ocean ships here take cargoes of it around the Horn to San Francisco. The coal delivered here the week previous to our visit amounted to 3,250 car loads; brought partly in wooden cars of the ordinary length, and partly in iron cars, of which the company have 1,750. The principal domestic shipments, however, are to Philadelphia, New York and Boston. The company have two iron warehouses, each 650 feet in length—one for foreign and the other for coastwise business exclusively. The foundations are just laid for an elevator 100 x 100 feet, and 117 feet high, having a capacity for 600,000 bushels, to be ready for this season's fall trade. The foundations rest upon 4,400 piles (yellow pine and hemlock), from 30 to 60 feet in length, all cut off at the low water line; and consist of 10 feet of stone masonry laid thereon. For transfer to the other city docks—from ¼ mile to 1½ miles—the company will have two barges (one now running, the other building) 145 feet long, and 33 feet in width, each carrying eight cars at once. These facilities will enable the company to load and unload sixteen cars at once.

All these improvements have been made within three years. They mark the era of the company's policy to make their terminal city an *entrepot* through which the Great West and the seaboard markets not only, but those of the Old World may find speedy, safe and economical exchange.

In this connection, the European steamship lines landing at these docks deserve a recognition for offering facilities, both for freight and passengers, equal to the older ones whose vessels land at other ports. Two lines are operated—one to Bremen, which began running in March, 1868; the other to Liverpool, the famous "Allan Line," which began running in December last. The steamers of the Bremen line (2,500 tons) are, Baltimore, Berlin, Leipzig and Ohio. The steamers of the Liverpool line (3,000 tons) are, Caucasian, Caspian, Ottawa, Nova Scotian. All constructed on the same model, the description of the Leipzig, which we thoroughly examined, will suffice for all. They are built of iron, each in seven sections, constituting separate, water-tight compartments. Dimensions:

length above deck, 340 feet; 39 feet beam; 30 feet depth of hold. The passenger accommodations are for 65 to 70 first-class and 800 steerage. The arrangements for both classes are equally perfect of their kind. The cabin is very airy; is artistically finished in native woods, and elegantly furnished; the arrangements for lighting and ventilation are admirable; connected therewith is a roomy, neat and comfortable ladies' private parlor; as also a pleasant gentlemen's sitting room, with all needed facilities for passing the time pleasantly in a social way. The staterooms, accommodating two persons, each having his separate berth in either end, are 7 feet square, and every attention has been paid (not alone in the matter of light and air) to the wants of the occupant.

The emigrants' quarters are arranged with a thorough regard to comfort and health. The company boards the emigrants—one excellent feature of which is the furnishing of fresh-baked bread each day.

The facilities for the debarkation of the emigrants, and their transfer to the cars *en route* for their destination in the Far West, merit special mention and commendation. Here, for example, is this population of 800 German emigrants just sent West from the Leipzig. They have made the trip from Bremen in fourteen days. They arrive in health and spirits,—indeed, as we learn, there has been no sickness among this class (we do not see how there can be) during the three years of the operation of the Bremen line. Ere the vessel reached the dock, every entrance to the depot and wharf was closed, and no person permitted inside whom the company do not know, and who has not authorized connection with its offices. On one side the passage way into the spacious depot, the new-comer found a ticket office; on the other a broker's office. There was no haste, no confusion. Nothing was done "on compulsion." At the ticket office all needed information was officially given in the emigrant's own language; at the broker's office (in charge of the company's regular banker, a house of reputation here and in Europe), he had his gold exchanged at current New York rates. Connected with the depot (in which they are undisturbed during their stay) he found all needed facilities for bathing, etc. In the transference of their personal effects, like dispatch and security were afforded; as also for passing through the Custom House. As the result of all, if the vessel arrived previous to the hour of 12 M., all who were bound for the West found themselves comfortably on board the train leaving Baltimore at 6 P. M.

As illustrating the facilities for freight shipment to Europe by these lines, it may be stated that just prior to the departure of the last three steamers, the company found that they would, unexpectedly, have room for 500 tons more than was provided for. In response to a telegram from Baltimore, this amount of freight was shipped from Chicago in cars on Monday, and was on board the steamer on Saturday evening, ready to sail.

— The directors of the Chicago & Northwestern Railroad Company re-elected at Chicago, Ill., on June 2d, the following officers: John F. Tracy, president; M. L. Sykes, vice president; A. L. Pritchard, secretary and treasurer; J. B. Redfield, assistant secretary. Mr. Dunlap, who had been re-elected director, resigned, and B. F. Allen, of Des Moines, was elected in his place. William C. Ferry, of Chicago, was chosen director in place of John B. Farmer, deceased.

The Railroads of Texas.

Horace Greeley, writing to the New York *Tribune*, from Columbus, Colorado county, Texas, under date of May 26th, 1871, says:

"But for railroads, Texas is doomed by nature to stagnation, impotence and barbarism. As yet she has barely begun to be penetrated by railroads. A line north by west from Galveston to Houston (50 miles), and thence by Hempstead, Navasota, Bryan, Hearne, etc., to Groesbeck, in Limestone county, soon to be extended to Corsicana, in Nevada county (say 250 miles from Galveston), with a branch from Hempstead westward across the Brazos through Washington county to Giddings, 55 miles, soon to be extended 50 miles further to Austin, the State capital, with another from Harrisburg, 6 miles below Houston, through Fort Bend and Colorado counties, across both the Brazos and Colorado to this point (84 miles), such are about all the pieces of railroad now in operation in the State. The piece from Shreveport, Louisiana, westward through Harrison and Smith counties to Hallsville (56 miles), is rather a suggestion than a practical road. And these are about all that are in operation to-day. The work of providing this people with necessary railway communication is barely well begun.

"But that is half the battle. At last, nearly every line seems to be in the hands of solvent, capable, upright men, who are backed by ample capital, and is pushed with vigor and clear-sighted resolution. The Texas Central is going right on north by west to meet one of the Kansas Pacific roads at the north line of the State, near Gainesville or Sherman. A new road, the Great Northern, striking north by east from Houston, pushes directly north from Houston, crossing the Southern Pacific near Tyler, strikes the Red river near Fort Towson, and connects with the Missouri, Kansas & Texas, from Kansas, near that point. The Chattanooga & Mobile is now pushing due westward through Louisiana, and expects to reach Houston before this time next year. These, with the Southern Pacific, now certain to be vigorously prosecuted, will give Texas not less than 1,000 miles of completed railroad within a year, and 1,500 within two years.

"But the most important and effective single line of railroad in the State is the International, which connects at Fulton, Arkansas, on her north-eastern border, with one from Cairo, Illinois, and thus with Chicago and New York, running diagonally through Texas from north-east to south-west, crossing the Southern Pacific and the Great Northern near Tyler, the Texas Central near Hearne, and thence pushing straight for Austin, the capital, and thence to San Antonio, and so to the Rio Grande not far from Laredo. This road, though begun last November, and impeded by the necessity of importing corn at a cost of \$2 10 per bushel, and hay at \$85 per ton for its oxen and mules, has been pushed right vigorously in either direction, and will have crossed both the Brazos and Colorado, and reached Austin on the one hand and the Trinity on the other by next May. Two years hence it will have been completed from Fulton to San Antonio (400 miles), and will then have brought the heart of this State within four days' travel of the commercial emporium, where it will be known as one of the most judicious and successful railroad enterprises ever planned. It will carry more beef cattle than any road on the globe, and it will bring into Texas more immigrants than railroad ever carried into any State till now.

"I close with a single instance of the spirit in which our Northern railroad builders are met by the people of Texas. The Legislature having granted a liberal subsidy in State bonds to the Southern Pacific Railroad, Gov. Davis felt constrained to veto the bill. The Legislature thereupon repassed it by a vote of seven or eight to one in either House; and the Democratic vote in the affirmative was, like the Republican, all but unanimous. And, while no man questions the purity of the Governor's motives, I have heard no dissent from the satisfaction with which the triumph of the measure is received."

RAILROADS IN ARKANSAS.—The Memphis & St. Louis Railroad has been put under contract from Helena to Morley, and the road is to be completed from Helena to the Missouri line in July, 1872.

Twenty miles of the Cairo & Fulton Railroad, from Little Rock northward, are completed. For nearly twenty miles beyond, the roadbed is ready for the iron. Probably in connection with the St. Louis & Iron Mountain Railroad at the Missouri line, will be made in twelve or fifteen months, making direct communication in almost an air line between Little Rock and St. Louis. The surveys and locations southward are complete for a distance of about 75 miles.

The Memphis & Little Rock Railroad, which was recently completed, is 150 miles long, and was commenced 18 years ago. In the present age of railroad building it would not take 18 years to construct a road 150 miles long!

RAILROADS IN TEXAS.—The Legislature has granted a charter for the "Mexico Gulf Branch of the Atlantic & Pacific Railroad." This grants to the company all the rights and advantages of the general railroad laws of Texas, which gives sixteen sections of 640 acres each for every mile of road constructed. The road is to run from St. Louis to Sabine pass, through the States of Texas, Arkansas, Missouri, and a portion of the Indian Territory. Sabine pass is at the mouth of the Sabine river, which separates Texas and Louisiana.

MAYSVILLE & LEXINGTON RAILROAD.—The *Carlisle Mercury* of the 8th inst., says: The public will join us in expressions of joy, when they learn that the large tunnel is completed. On Saturday last a horse and cart passed through for the first time, the obstructions having all been removed; since that time the masons have worked with remarkable zeal, and on yesterday concluded their labors. The "last touch" has been given, the completion of the stupendous work is accomplished, and all is now ready for the rails.

PADUCAH & MEMPHIS RAILROAD.—The Memphis people are considerably aroused over the projected Memphis & Paducah Railroad. It is stated that the Messrs. Norton, Trimble and others agree to complete the road from Troy station to Memphis, if the city of Memphis will take \$250,000 stock or pay \$200,000 in money, the road to be completed in from 12 to 18 months.

— The stockholders of the Chicago, Rock Island & Pacific Railroad Company, re-elected the old board of directors, at Chicago, Ill., on June 7th, except that H. Kennedy was chosen in place of John Hearn, of Erie, Pa., deceased. The old officers were re-elected by the directors.

Railway Subsidies in California.

The Supreme Court of California have recently—through Judge Wallace, who pronounced a very able opinion—decided that municipal aid granted to railways is constitutional in that State. The opinion, for which we are indebted to the San Francisco *Bulletin*, is too long to give entire; but we present such a synopsis of it as will enable our readers to gather its tenor and the grounds upon which it is based:

The Stockton & Visalia R. Co. vs the City of Stockton.

An act was passed by the Legislature of California, approved April 1, 1870, entitled "An act to empower the city of Stockton to aid in the construction of the S. & V. R. R."

In substance, it directs the municipal authorities of the city to donate \$300,000 to a company who propose to build a certain railroad, having a permanent terminus in the city. Under its provision the bonds of the city for the entire sum are to be placed in the hands of three persons who are to deliver the bonds to the company from time to time, as the work gradually progresses. These bonds bear interest annually at a fixed rate, and to pay the interest as well as the principal, the act directs the municipal authorities to levy an annual tax in the usual manner. The authorities have pursued the directions given them by the Legislature so far as to prepare and deliver the bonds to the persons named, but they now refuse to levy a tax to pay the interest thereon.

To compel them to do so, application for a *mandamus* is made by the railroad company. The application is resisted upon a single ground—"that said act and all its provisions are and ever have been repugnant to and in violation of the Constitution of the State."

It is thus apparent, says the court, that the case must turn wholly upon the question of constitutional power in the Legislature to enact the same, and our duty begins and ends with a consideration of that point of law. We are not here to pass upon the motives of the authors of the statute. We have no authority to reform or call them to account for the manner in which they have conducted public business. Questions regarding the mere policy of the statute—as to whether it is in itself a wise or foolish law—whether its anticipated operation will promote or retard prosperity, are not for us to consider, for these questions involve mere political inquiry.

The authority of the judiciary to consider of the extent of the legislative power in the enacting laws was formerly denied *in toto*. In the early days of the Federal Constitution some most distinguished public men and Jefferson himself maintained that no court had rightful authority to declare a statute unconstitutional which had received the sanction of the popular will acting through its representatives. An impeachment of a judge of a State Supreme Court was, at a later period, instituted for an attempt to uphold this power admitted to be anomalous, and upon his trial but a single vote was wanting to his conviction of usurpation of authority. Though the power itself is now admitted, it is conceded to be always of the utmost delicacy to exercise, and was never to be exerted except when the conflict between a statute and the Constitution is palpable and irreconcilable; and to this effect the authorities are substantially uniform.

* * * * *

We think that adjudications in this court give the correct definition of the judicial

power to declare a statute unconstitutional, as now maintained by the general current of authority. It is said (12 Cal., 384,) that it "should never be exercised unless there is a clear repugnance between the inferior and the organic law." Again: (17 Cal., 30) "But the Legislative department, representing the mass of political powers, is no further controlled, as to its powers or their exercise, than by the restrictions of the Constitution. Such restrictions must be shown before the action of the Legislature as to either can be held to be invalid. But it is equally well settled that the power to declare an act unconstitutional is not to be exercised in doubtful cases, but that a just deference for the Legislative enjoins upon courts the duty to respect its will unless the act declaring it be clearly inconsistent with the fundamental law."

The law-making power is the supreme power in the State, and the Legislature in its exercise impersonates the aggregate sovereignty of the people. Hence, the Legislature is politically omnipotent, except as its power has been limited, qualified, or absolutely withdrawn by the Federal or State Constitution. * *

Whenever, therefore, it is alleged, that a statute enacted in due form by the Legislature is in excess of its authority to enact, it is necessarily the allegation of an exception contrary to an admitted general rule; and, therefore the construction is "strict against those who stand upon the exception, and liberal in favor of the Government itself." Hence, when we are called upon to declare that the Legislature has no authority to enact a particular statute, it is necessary that we be pointed to the clauses of one or both constitutions supposed to have taken away or limited the power to something else than the subject to which it is applied. The "spirit of the Constitution" imposes no limitation to the legislative power. A limitation ought to be something definite in itself—as definite as a sum to be subtracted from a larger one in order to ascertain a balance.

The "spirit of the Constitution" as an interdiction upon legislative power was repudiated by this Court in *Patterson vs Supervisors of Yuba Co.* (13 Cal., 182), in which Judge Daniel, of the Sup. Court of the U. S., said that if "a law might be declared unconstitutional because of its supposed repugnance to the spirit of the Constitution, judges ought to employ a medium to procure authentic revelations from that spirit." The "spirit of the Constitution" as a means to ascertain the powers of other departments would partake too much of the personal spirit of the individual judges for the time being—and chameleon-like it would be apt to prove of any color which the peculiar views of those having the spirit in their keeping might impart to it.

The rule requiring that an alleged limitation upon the powers of the State Government should appear either by words or by an implication necessarily flowing from them, and without which they can not have their natural force and fair import, is firmly established. It assumes that it was the intention of the people that their representatives should exercise all political power except such as the people themselves have singled out and forbidden to be exercised at all, or permitted to be exercised only upon certain conditions. If, however, there be among the great powers of government a single one upon which more than upon any other we would anticipate that the intended limitation of the power would have found exact and careful expression upon the face of the Constitution itself, that one would be the power of taxation—for it is noto-

rious that in this country and elsewhere it has more than any other proven to be the exhaustless source of political disquiet and disturbance.

In this country the Revolution, as it is well known, originated in the idea so firmly fixed on the popular mind that taxation should be imposed on the people only through their chosen representatives. Hence, in organizing the Federal Government the House of Representatives were given the sole power of originating bills for taxation, and various constitutional provisions upon this particular subject are to be found in the Constitutions of some thirty-three States. It would be somewhat strange in view of that history if it should, after all, appear that those who framed the Constitutions of the States, and especially that of California, should have failed to limit the power of taxation in every respect deemed practicable. We accordingly find in the Constitution of California an important limitation, not upon the extent of power itself, but upon the mere mode upon which it was to be exerted. Taxation was thereby required to operate equally and uniformly, and upon the *ad valorem* principle. No attempt was made to limit the power itself.

Taxation originates in the financial necessities of government, and necessities illimitable by human agency—the means of the supply to be adequate must be illimitable too. It can not be foreseen by the framers of a constitution who would limit the power of taxation, what may be the necessities of the government at a given time, or under the pressure of attack without support, or insubordination within its borders; or what pecuniary means it may need in its possible struggle with those difficulties which it is the very purpose of government to meet and overcome. To assure the public safety it therefore dictates that the State be clothed with power to command its entire material resources. * * *

The (constitutional) convention understood well that they had not limited the power of taxation and the reason why they could not venture upon the experiment. This is seen by § 37, Art. 4, where they restrict the power of municipal corporations to impose taxes; this restriction could be safely imposed because the safety of the State was not supposed to be committed to the municipalities. That the convention would have imposed some limitation upon the taxing power of the State had it been considered advisable, can not be doubted, for they limited the public indebtedness to a fixed sum, (Art. 8,) but they omitted, and evidently *ex industria*, to place any limitation upon the mere power of the State to impose taxes. The principle upon which taxation is to be imposed is pointed out, but the extent to which it may be carried is left unlimited, except by Legislative discretion.

It is to be exerted to raise money for public use. The "public use," though mentioned in the Constitution, is not mentioned with reference to the power of taxation or in connection with any limitation upon it. It is declared (§ 8, Art. 10) that private property shall not be taken for "public use" without just compensation. No constitutional definition of the words "public use" is, however, given in that instrument.

For much the same reason as that mentioned concerning limitation upon taxation, the "public use" seems to have been left in a large measure to the determination of those who were clothed with the exercise (of the power of eminent domain) in view of possible contingencies rather than to a tempt its restriction by anticipation.

"Public use," "public purpose" and "public policy" are much the same in import. "Public policy"—the policy upon which government affairs are conducted for the time being—is legislative policy in the main, and "public use" and "public purpose" are largely dependent upon this policy—notoriously varying in our country from time to time with the accession to power of political parties differing from each other as to the system of measures. The resolve of a legislative body, by which a tax is imposed or private property taken, is therefore necessarily a legislative determination that the public use is to be promoted by the tax or the taking directed.

The Legislature, in the case before us, having determined the construction of the contemplated road to be a matter of public concern, and as such authorized taxation to aid in the work, the question arises as to how far that determination is open to review in the courts. That question was answered by this court in the *Napa Val. R. Co. vs. Napa County* (30 Cal. 437): "Railroads concern the public interest as matters of legal judgment, and however that conclusion may be opposed to the fact in the case at bar makes no difference, the action of the Legislature on the question not being open to review by the judicial department of the Government."

If we could review the legislative determination upon that point at all, a question would necessarily arise as to the extent to which that review could be carried here. Could we substitute our judgment upon that point for that of the Legislature absolutely, as we sometimes substitute our judgment for that of a court from whom an appeal has been prosecuted to this court? If it was the intention that we should do so, it would seem that the law should have pointed out some mode by which we could get before us in an authentic form the facts and circumstances upon which the Legislative Department proceeded in the case. In the absence of these facts and circumstances we would be unable to say that an error had been committed at all. A case might, indeed, be presented in which it might appear beyond a question that a tax had been imposed, or property taken for a use or purpose in no sense public; "where there was no pretence that the public was to be benefited thereby," and in such case it would be our duty to interfere and afford relief. But should we interfere in any other than such a case, we would but substitute a policy of our own for the legislative policy, and our will for that of the representatives of the people, the legislative judgment may have discovered a public use and benefit in the encouragement of a particular class of improvements; it may be a public use in the building of a bridge, a road or a mill, and may, in that view, aid its construction by giving it public funds. We may be ourselves unable to see why the particular work thus selected for aid should be preferred to another work which has been wholly overlooked; but we can not, upon such a view, forbid the government's aid to the work selected, any more than we could direct a similar bounty to the other work. * * *

The rule applicable to the case at bar is, that if it is possible that the work or object selected by the Legislature for aid concerns the public use, we must consider that it does in fact do so; if possible, therefore, the city of Stockton may have a public interest in this railroad—then the legislative action is conclusive here that the city does, in fact, have such a public interest therein.

The field of legislative policy is vast in ex-

tent—it embraces in its ample range whatever can be supposed to promote the interests of the body politic, enhance the public revenues by increasing the value of objects to be taxed, facilitate the free interchange of commodities, or improve the social, moral or physical condition of the community. These and other light purposes fall within the constitutional power of the Legislature as being of a public character to be fostered and advanced in its discretion. Within this broad range it is for the Legislature to select such objects as in its judgment may appear as deserving the munificence of the Government, and in so doing "the Legislature can not be held to any technical or narrow rule." The discretion to determine what is and what is not a public purpose is confided to the Legislature, and in the exercise of this discretion that body may, and indeed habitually does, clearly overstep the mere actual necessities of the public administration. In California, for instance, did any one seriously question the authority of the Legislature to appropriate the public moneys to meet the personal wants of the overland emigration in 1852? Yet, in the absence of the legislative discretion involved, in point of mere constitutional law the overland emigrants had no right to be fed and clothed out of the public pocket more than other people. * * * As we have already said, under the rule laid down (30 Cal. 417), this legislative determination is conclusive upon this Court. It was there held that "railroads concern the public interest as matters of legal judgment," and that when the Legislature had determined that a particular road in fact concerns the public interest, its determination is not open to be reviewed by this Court.

But even if the rule were otherwise, the result would be the same. Should we undertake to review the legislative determination that this road concerns the public interest, we could not disturb it, unless we are prepared to say that there is actually no possibility that the proposed road could in any degree promote the public welfare. It is conceded by the respondent that the road itself is one which the State might have lawfully constructed at the public expense.

It is not denied that the State may, in the exercise of the power of eminent domain, take from unwilling proprietors the lands necessary for the building of the road. Yet such a taking can only be supported upon the theory of a "public use" to be promoted. Can there be a use which is sufficient in a constitutional point of view to seize the property of all? If so, we have not found it.

We know that a distinction has of late been attempted between "public use" for purposes of eminent domain and "public use" for purposes of taxation. A *quasi* public use is therefore intended to be something more or something less than the "public use" pure and simple mentioned in the Constitution. Those who have originated the phrase "*quasi* public use" have, however, omitted to give it a definition. In fact the term is employed for the sole purpose of distinguishing a mere fictitious public use from a real public use, and thereupon it is argued that the power of eminent domain which may be exerted in favor of the road as being for public use, does not establish that taxation may be exercised for the same purpose, because the public use which will support the former is not actual but only *quasi*—but that the public use which is requisite to authorize taxation must be something more.

The results of such reasoning is that the

license by which a citizen holds his money is of a higher and better character than the license by which he holds his land, and a "public use" to which one may lawfully refuse to contribute his money to-day is nevertheless one to which he may be compelled to surrender his house to-morrow.

It is said that in the case at bar the act is not taxation within the meaning of the Constitution, because it is "simply taking the money of one man and giving it to another," and that therefore it is not the raising of money to meet "the public consumption or expenditure," nor to provide "for the use of the State, nor for the use or benefit of the State Government." This proposition is based upon the alleged fact that the corporation which is to receive this money is a private and not a public corporation, and that the road is to be operated by the corporation for its own benefit.

The general power of the State to build such a road as this one is admitted. The authority to build it upon the basis here adopted is denied. It is not the power to construct but the mode of its exercise which is questioned. We might put this objection at rest by simply repeating the language of Judge Baldwin in delivering the unanimous opinion of this Court (17 Cal. 30): "But the Legislative Department representing the mass of political powers, is no further controlled as to its powers or the mode of their exercise than by the restriction of the Constitution." * * *

When it is said that the Government possesses the power to prosecute a public enterprise through a private agency, the power to compensate such an agency is necessarily conceded, otherwise the power would be practically incapable of execution, and so no power at all. The power to compensate the private agency is therefore clear enough, the measure and mode of that compensation are mere details which will vary with the prevailing habits of the public service, the condition of the public treasury, or the mere policy which would seem to recommend one plan as preferable to another. Of the propriety of the mode of compensation adopted in a particular case, it is for the Legislature to judge, and no provision of the Constitution is violated in the mode adopted here. * * *

The power of the State to foster and regulate internal improvements is unquestionable. Should we deny to the Legislature the possession of this power, or attempt to narrow its clear constitutional scope by applying to it the uncertain measure of our own views, we would in the hope of accomplishing a temporary good permanently mar the symmetry of the structure of the government itself.

Under constitutions substantially like ours, railroads, though operated by private companies, are by mere legal conclusion for "public use;" the power of eminent domain, confessedly exercisable in behalf of "public use," may therefore be exerted in behalf of railroads under legislative permission; as fostering the "public use," aid may be extended to the construction of such roads by the power of eminent domain or of subscription to capital stock and by donations made by cities and other political subdivisions of the State under the authority of the Legislature first given (or subsequently obtained) and such is the purport of judicial decisions of the highest courts of our largest States. These decisions cover a period of little less than a half a century of time; and they embody the views of constitutional law with reference to the question before us, which were entertained by


some of the most distinguished jurists who have shed lustre on the American bench


Upon authority, and upon principle as well, we think that the act in question can not be said by us to be in any sense unwarranted by the Constitution, or beyond the constitutional authority to enact.

It is ordered that the writ of *mandamus* issue as prayed for.

WALLACE, J.

Rhodes, Ch. J. concurred fully; Judge Crockett concurs but submits a separate opinion. Judges Sprague and Temple concur solely on the authority of decisions in this and other States.

 The Owensboro & Russellville (Ky.) Railroad, we learn, is now in operation for twenty miles to Livermore, on the Green river, and has been put under contract for fifteen miles more, to a point where it will join the Elizabethtown & Paducah Railroad, which will give Owensboro a connection with Louisville. This is the line on which the Rockport Railroad relies for its Southern connections.

 Charles E Stewart has recently been appointed master mechanic of the Panama Railroad. Mr. Stewart has been in the employ of the company, in the mechanical department, at Aspinwall, for a number of years.

—The annual election of directors of the New York Central & Hudson River Railroad Company, was held at Albany, N. Y., on June 7th. Thirty-five millions of stock were voted on, and last year's board was re-elected entire. The following are the names of the directors: Cornelius Vanderhilt, William H. Vanderhilt, Horace F. Clark, Augustus Schell, James H. Banker, Samuel F. Barger, William A. Kissam, H. Henry Baxter and Joseph Harkey, all of New York city; Henry R. Pierson, Albany, N. Y.; Chester W. Chapin, Springfield, Mass.; George J. Whitney, Rochester, N. Y., and Jas. M. Marvin, Saratoga Springs, N. Y.

—The Topeka, Atchison & Santa Fe Railroad is in running order from Topeka to Florence, 106 miles, and is being constructed from Florence to Newton on the south, a distance of 30 miles, and from Topeka to Atchison on the north, a distance of 50 miles. It is also contemplated to build a link from Carbondale to Olathe, where a junction will be effected with the branch of the Missouri Pacific Railroad now building from Pleasant Hill, thus giving St. Louis direct rail communication with the counties in Kansas, lying in the valley of the Arkansas river.

—The annual meeting of the bond and stockholders of the St. Louis, Alton & Terre Haute Railroad Company was held in St. Louis, Mo., on June 6th, and the following directors, whose term of service had expired, were re-elected: Levi Davis, of Alton; Anthony Thornton, of Shelbyville; George W. Parker, of Charleston, Ill.; Thomas Dowling, of Terre Haute. The directors organized, by selecting Charles Butler, of New York, president; George W. Parker, of Charleston, Ill., vice president; W. G. Broughton, general superintendent; W. W. Thomas, secretary and auditor, and H. S. Depew, general freight agent of the line. This road is leased by the Indianapolis & St. Louis Railroad Company, but the company still operate the Belleville & Southern Illinois road, which it is proposed to extend to Paducah, Ky.

—The \$50,000 necessary to be subscribed before the Frankfort, Paris & Big Sandy Railroad Company could be organized, was obtained by individual subscriptions, and the stockholders met at the Bourbon House in Paris on the 6th inst. The following named gentlemen were elected directors, viz:

Bourbon—B. F. Pullen, B. F. Rodgers, and Gen. J. T. Croxton.

Franklin—Col. J. Stoddard Johnson and E. H. Taylor, Jr.

Scott—Capt. J. E. Cantrill, Noah Spears and Alex. Thomas.

City of Louisville—Dr. E. D. Standeford.

Montgomery—W. S. Richart.

Bath—J. S. Richart.

—It is stated that the Elizabethtown & Paducah Railroad Company have recently effected the sale in Europe of a large amount of mortgage bonds of the road, the total amount sold up to this date summing up about \$3,000,000. The price obtained, we learn, was eighty-five cents in the dollar. This will insure the completion of the road to Paducah in from 12 to 15 months from this time.

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Railroading From My Standpoint.

FISHKILL ON THE HUDSON,
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I am glad I had no "pass" over any railroad to the East, because I can now say what I think of the said railroads; not that I ever said anything contrary to my opinion, but that I have abstained from something. I left the town of Morrow on the Panhandle route. Ah! the world knows that we are swallowed up in Ohio by the great corporations. Perhaps they will buy the State after awhile; but at any rate, they have bought all the roads. The "Little Miami," which I thought a model road, has been swallowed up by the "Pennsylvania," and so has the "Cincinnati & Zanesville," so recently has the New Jersey roads, and so on. The time is near when no man can cross the country in any direction without leave of one of three or four great corporations; and by combination of those great corporations (as is now doing) he may be compelled to any terms they impose. But you will say, it is their interest to give you the best terms, and as cheap as possible. If there were competition between these routes, that would be the case; but in their combination, not at all. Just now, the three northern lines, which carry almost all the traffic of the West, have raised the rate of freights from 35 to 40 per cent. I don't know whether that is too high, but I know that it is conclusive proof that they can raise the price as much more, if they please. Where will this end when all the great transit lines are in the hands of three or four men? and they are very nearly so now.

But let us get on. I went to New York in 26 hours. It took my father 26 days, for he had to huy aod go in his own carriage. For this vast change in time and cost I am as grateful as any one; but there is still a question. Is this vast and useful machine conducted as well as it can be? No one need be told that the Pennsylvania road is almost a model in management. It meets with few accidents, and the conductors and managers are pleasant and civil men. But I have some comment to make on that. You hear a great deal said about the "palace cars," and their comforts, etc. This is very well; and they really are very comfortable; but the charge for them is at least *double* what it ought to be. For example, I got a small stateroom, with two berths for two ladies, and the charge was \$8. Then I got a herth for myself in the common sleeping room (for which no charge ought to be made in any case), and was charged \$4 for that. Here are \$12 for three berths. Now for what is it necessary to make that charge? The capital in a palace car is a few hundred dollars more, and the company should have interest on that. Again, the car thus arranged will perhaps hold 8 or 10 persons less, and something should be allowed for that. But one-fourth the charges they are now making will cover the whole of that; \$1 each for these extra herths is amply enough. As at present arranged, these extra berths in palace cars are only a contrivance to extort money from invalids and ladies, who can not sit up.

Again, the price of tickets, \$20 from Cincinnati to New York, is not too much. That is perfectly fair. But why should one who gets on at Morrow, Columbus or Coshocton be made to pay much more in proportion than one who gets on at Cincinnati? What more expense is he? Take my case, for example. I had an annual ticket to Columbus, 120 miles from Cincinnati. I had a right to suppose my fare to New York would be something less. Not at all. It was actually more! My fare was: from Columbus to Pittsburg, \$7 40; from Pittsburg to Philadelphia, \$10; and from Philadelphia to New York, \$3 25—in all, \$20 65. From Cincinnati it is \$20; so that, taking into view my ticket to Columbus, I was actually charged \$4 more for getting on at Morrow than I should have been at Cincinnati. I don't say these charges are too high. I only say, they are wrong. I say more, they are contrary to sound policy. I was, practically, a way passenger; and if there be any thing true in railroad policy it is that way passengers should be encouraged. They make the great hulk of passenger traffic, and the charge from point to point should be if not less—at least no more than the pro rata for the whole line. In my opinion, the great railroad corporations are fast driving themselves into an issue with the country.

But let us return to our trip. It was short

and pleasant. There was nothing to complain of in the comforts of the journey, and every thing to commend in the excellent management of the Pennsylvania road. One thing I noticed, which seemed unaccountable,—the Ohio part of the road was smoother and with less jarring than the Pennsylvania; I had supposed it was the reverse. The fact is, our Ohio roads are generally in very good condition, probably the best, on an average, in the country.

We arrived in New York at 2 P. M., and immediately went up the Hudson River Railroad to this place—Fishkill. One would think this old part of the world would be destitute of all railroad excitement. Not at all. There are more railroad enterprises here than in Cincinnati. 1. There is the Dutchess & Columbia Railroad, just finished. In the eastern part of Columbia county adjoining Salisbury (Conn.), there are iron mines of very peculiar and excellent quality. Some capitalists in New York have made that the basis of a railroad some 40 miles long, which brings the aforesaid iron down to the Hudson by the way of Matteawan creek. This road really has a good business, and the iron is likely to make a large traffic. 2. The Hartford & Erie, you know, has failed; and that was a good scheme to make a road from Boston directly to the West and the Pennsylvania coal mines. That company has failed, but the object will be accomplished. Some enterprising genius has got a charter from Fishkill to a point east on the Harlem road, and to that again there is a Connecticut road chartered and progressing, and which will be made. So the great road from Boston west, and going through northern Pennsylvania, will be made, through this place. 3. There is quietly going on, almost unnoticed and unknown, a railroad on the west side of the Hudson. I found that out by a newspaper advertisement. Twenty miles are completed, to New Paltz, and it is under contract to Kingston. Thus, you see, railroad enterprise is not over, on the old Hudson.

But, one of the great questions is, how, when and where to bridge the Hudson! What would the last generation have thought of bridging the Hudson? They really are going to bridge the Hudson. Gen. McClellan and his co-engineers have decided that the Hudson can be bridged at Fort Montgomery. I dare say, but what will the bridge do there? The river is very narrow there, and easily approached. But on the west it runs right against the Sugarloaf. What then? So, they threaten to bridge the river at Poughkeepsie. Well, go ahead! Bridge the world. But, in the meantime, I am yours truly. E. D. M.

— A deed of trust for \$2,000,000 of the second mortgage bonds to be issued by the Illinois & St. Louis Bridge Company has been recorded. Solon Humphreys and John A. Stewart, of New York, are the trustees.

Capt. Hall and the North Pole.

It is with no ordinary satisfaction, and we doubt not fully shared with us by many of our readers, that the announcement is received of the sailing of Capt. C. F. Hall for the polar regions. We have personally known Capt. H. for about twenty years, and although we can not exactly say that we fully enter into his enthusiasm over the hope of reaching the North Pole, yet we sympathize with and wish him Godspeed in his efforts.

Some of our oldest citizens will remember (perhaps forty years ago) the excitement over the theory of Symmes that the North Pole was a hole, or hollow tube through the Earth, full of genial light and heat, with all the glowing glories that are often painted for the future world, and the expedition that was planned in Cincinnati and came near being carried (with old man Symmes at the head of it, and failed only from lack of Government aid) into an actual search for this fairy land. Some are still living who were volunteers on this expedition.

Cincinnati again has the honor of promoting, and this time of sending out one of her citizens to see if the theory of "Symmes' Hole" be true.

The following is an interesting account of the vessel and her appointments:

The steamer is about 400 tons measurement, considerably larger than the *Advance*, in which Dr. Kane undertook his famous voyage, and about the same size as the *Germania*, which left Bremen two years ago on an expedition to the Arctic seas. She has been planked all over her sides with six inches of solid white oak timbers, and has throughout been nearly doubled in strength; her bows being almost a solid mass of timber, sheathed with iron, and terminating in a sharp iron prow with which to cut through the ice. Her engine, which was built some years ago, at Messrs. Neafie & Levy's works, in Philadelphia, is exceedingly powerful and compact, taking up but comparatively little space, and being peculiarly adapted for hard and severe work; and the propeller is arranged in such a manner, that it can be unshipped and lifted up on deck, through a shaft or "propeller well" in the stern, which is a great advantage when the vessel is under sail or surrounded by floating ice that might easily damage the blades. And, even in the worst case, a supply of extra blades has been provided, so that if by accident one should be broken, it can always be replaced. There is also an extra rudder on board, and several suits of sails and sets of spars of all dimensions. Of the two boilers, one is supplied with an apparatus to use whale oil for the generation of steam, as this will, in all probability, have to be relied upon when other fuel gives out, not only to furnish the propelling power, but also to heat up the vessel throughout by steam, which will, of course, be necessary, as soon as the cold and wintry regions have been reached.

Steam will merely be used as an auxiliary, as the *Polaris* is rigged as a foretopsail schooner, and is fully able to sail and steer under canvass only. A novel and interesting feature in her construction is a new sort of life-preserving buoy, which is placed on the outside of the vessel, in the stern, and can be

lowered into the water by touching a spring which is placed near the pilot house. By touching another spring, an electric light, which is fixed upon the buoy about two feet above water, is ignited by completing the circuit of an electric current from a galvanic battery on board; and no matter how dark the night, or how obscure the arctic winter, the buoy can always be distinctly seen, and the man who has fallen overboard will know in what direction to swim for hope and help. Another excellent and peculiar part of her outfit is a canvas boat, the invention of Mr. Hegeman, of Saratoga county, N. Y., by whom it has been patented, and from which Capt. Hall expects great results. As yet but one of these boats has been received, but another and smaller one will be added before the vessel leaves New York. The boat that we saw is 20 feet long, 4 feet wide and 2 deep, has a carrying capacity of 4 tons, weighs only 250 pounds, and can carry with perfect ease and safety 20 men. It consists of an interior frame, built of hickory and ash woods, over which is stretched a canvas cover that has been previously soaked in a preparation to render it perfectly waterproof; and the whole boat can be taken apart and folded together in a space less than one-eighth of its original size, in about three minutes, and by the assistance of a couple of men only. When folded up it is perfectly flat, and can be transported on a sledge across the ice without the least difficulty. When open water is reached the order of things is exactly reversed—the boat is unpacked and spread out, and the sledge and its contents taken on board, dog team and all.

As to those who are going to be the principals in this adventurous and dangerous expedition, they are, all told, 29 men. There is not a man among them whose qualities and character have not been well tested, from the captain down to the cook. The leader and commander-in-chief is, of course, Capt. Hall; next in the command comes Capt. S. O. Buddington, an old whaler, of 30 years' experience, 21 of which were spent in the Davis strait and Baffin's bay. He is an old and trusted friend of Capt. Hall, who has implicit faith in his long experience and acknowledged ability. The second officer is Mr. H. C. Chester, also a whaling man, of 12 years' experience among the ice; and the third officer is Mr. William Morton, who was Dr. Kane's trusted friend and companion, and is the only living mortal to whom it was ever permitted to look upon the open Polar sea. He had the sad privilege to accompany Dr. Kane to Havana, and to bring his remains from there to Philadelphia for interment. Mr. Emil Schumann occupies the post of first engineer, and the scientific corps will consist of three gentlemen, one of whom, Dr. Emil Bissells, of Heidelberg, Germany, will attend the expedition as a surgeon naturalist. A student from the observatory at Ann Arbor, Mich., will probably be the astronomer; and an officer of the Signal Service Department will be aboard in the capacity of meteorologist. Besides these, there will be a blacksmith, carpenter, steward and 14 sailors, besides the Esquimaux interpreter, Joe, and his wife, Hannah. The latter interesting couple, with their little daughter, are genuine specimens of the Esquimaux, but having been in constant company with Capt. Hall for eight years past, they speak very good English, and have acquired civilized manners. Joe is a famous hunter and "sealer," and his little wife is quite an accomplished woman in a "small" way, with considerable talent for languages and music. Their little daughter,

who will accompany them, is five years old, and has been for some time at school in Connecticut, where her parents have been lately residing, the guests of Captain Buddington. They will join the ship at the Brooklyn Navy Yard, and a nice cosy little cabin has been fitted up for the exclusive use of them and their child. They are glad to visit once more their native fields of snow and ice; and it is not at all certain that they will again return with the expedition.

Although Capt. Hall expects to accomplish his purpose of penetrating into the great Polar basin, if such an one really exists, and visiting the North pole, in less than three years, the *Polaris* has been provisioned for four years, which can be extended to six, with a little economy and judicious distribution of rations. The great staple of provisions is the so-called "pemmican," which is composed of three parts of selected dried meat to one part of the best suet, mixed with some other ingredients. The food is both nourishing and wholesome, and there is no danger of scurvy through the absence of salt—that pestilence of Arctic travelers—to be feared from its use. It is packed in 45 pound tin cans, hermetically sealed, and of this there is no less than 10,000 pounds stowed away in the hold, the manufacture of which consumed and condensed 23,000 pounds of ordinary beef and 5,000 pounds of suet. Besides this, there is any quantity of dried and desiccated vegetables, such as potatoes, tomatoes, onions, etc., and a large stock of flour, biscuits, sugar, coffee, tea, condensed milk, canned fruits, and all other necessities for a protracted voyage. Capt. Hall, however, expects to be able to economize these provisions to a very considerable extent by substituting in their place the meat of the reindeer, musk ox, walrus, and other game of the regions he is about to explore. Everything has been done to make the quarters of both crew and officers as comfortable as the rather limited space would permit; and the between decks and cabins are perfect models of cleanliness. The staterooms, for the officers and scientist, are plain, but gotten up in good and convenient style, and the cabin aft is a perfect drawing room in miniature. Handsome chromos decorate the walls, and a fine cabinet organ, a present to Capt. Hall from the Smith American Organ Manufacturing Company of Boston, promises cheer during the long arctic winter. A handsome carpet covers the floor, and there is an air of calm comfort about this little room.

A Big Thing.

At a recent meeting (June 12th) in Philadelphia, to listen to a lecture from Hon. Wm. D. Kelley, "On the Development of the Northwestern Portion of the Country, and the Effect of Building the Northern Pacific Railroad on the Trade and Commerce of the Middle States," the meeting was presided over by Gov. Geary—and four hundred vice presidents.

To a "superficial observer" it would appear that "vices" prevailed (to an alarming extent) in Philadelphia.

But, then, it must have been—like the subject listened to—a *big thing*, and not easily handled. "Mine Got! what a coduntry!"

—Arrangements have been effected for the immediate extension of the Missouri, Kansas & Texas Railroad from Harrisonville, Mo., to Paoli, Miami county, Kansas, to be completed by October 1.

Northern Pacific Railway.

LECTURE OF JUDGE KELLEY.

The *United States Mining Register* thus alludes to the very able lecture of Judge Kelley, in relation to the development of the great North-west by the construction of the Northern Pacific Railroad:

The Northern Pacific Railway runs through the richest of wheat lands, Minnesota, the richest of metalliferous countries, Montana and Idaho, the most prolific and salubrious of climes, Oregon and Washington, Judge Kelley spoke especially of the climate of the 47th and 48th degrees of latitude along which the road would run, as being more temperate and equable than that of Philadelphia and Baltimore. The mean temperature of Olympia, at the head of Puget sound, is that of Norfolk, Va., but there neither the cold of winter nor the heat of summer is felt. Cattle browse out the year round. The valleys of Idaho, Montana and Dacotah are full of game, buffalo, elk and antelope, which have the severest winter; and worn out emigrant stock run wild and grow plump and strong by spring.

Judge Kelley then enlarged on the immense wool feature of the great North-west, and prophesied (we think without sufficient reflection) that it would become the greatest sugar-growing—*beet* sugar-growing region in the world. The route of the Northern Pacific crosses the Rocky mountains at Cadott's pass, which is only 4,950 feet above the sea, 3,000 feet below the level of the Union Pacific at Sherman.

The speaker then compared Puget sound as a terminus with San Francisco, with a better coast and harbors, and nearer to China. And he summed up the advantages of the route in the words of Capt. A. A. Humphreys and Lt. G. K. Warren:

"The advantages of this route are: Its low profile, which is important in relation to climate; its easy grades and small amount of ascents and descents, both important if the road should be developed to its full working power; the great extension west of the prairie lands; in the supplies of timber over the western half of the route; the facilities which the Columbia river and its tributaries, and the Missouri will afford to the construction of the road; in the short distance from the Missouri to a seaport of the Pacific; in the western terminus of the road on Puget sound being nearer to the ports of Asia than the termini of the other routes; in the proximity of the eastern terminus to Lake Superior, from which a continuous navigation for seagoing vessels extends to the Atlantic ocean; and in the existence of coal on Puget sound."

He then adduced the interests of Pennsylvania and Philadelphia in the road, as a home for our surplus population, especially our mechanics when past the age of successful competition with younger workmen—and as a reservoir into which to draw off from the Atlantic seaboard the European inflow.

"What effect," he asked, "what effect upon the commerce of Erie with her unrivaled harbor, must the completion of such a work have? Vessels leaving the head of Lake Superior will discharge their cargoes at Erie for New York, Philadelphia and Baltimore; and it requires but little power of the imagination to behold the city of Erie equalling Buffalo, Cleveland and Detroit, and expanding into generous rivalry with Chicago."

These facts expressed by the orator were none

of them new; but they were none the less important to those who listened to his eloquence, and none the less grand in themselves. It was easy to scoff at Whitney's subject in 1846. It is impossible not to believe it a comparatively easy enterprise in 1871. No one can doubt for a moment trains of cars will run as regularly along the Northern route to Puget sound five, or perhaps three years hence, as they run now over the Central route to San Francisco. But very few have made themselves acquainted, as Judge Kelley has, with the natural necessity for such an event to come to pass, or with the consequences to millions of human beings destined to cover those plains, fill those valleys, and line those mountain sides, with the homes and workshops of civilized society. Those who heard him speak last Monday night made a large stride forward in their comprehension of this the next new great event of our day.

Railroad Monopolies.

Can anything be done to check the growth of huge railroad corporations? And if so is for the public interest to prevent that growth? Or can the evils incident to such monopolies be safely left to exhaust themselves and to work their own cure? Such are some of the questions which have long been agitating the minds of our thoughtful men, and they have been stirred up anew by the recent gigantic operations of the Pennsylvania Railroad. In 1861 this company had a capital of \$31,224,415. Last year its capital had augmented to \$71,572,823, and it is now the richest and most powerful corporation on this continent. The development of its resources has been unexampled. In 1868, the Erie road, jealous of the progress of the Pennsylvania Central, sought to cut off its Western connections and confine it to its own State. These efforts, after a temporary success, were at length overcome, and the Pennsylvania Central now owns by perpetual lease a far reaching network of roads, which radiate to all points in the West and South-west. By one of these it reaches Chicago, by another St. Louis, by another Cincinnati; and the report was lately started that it has almost perfected its arrangements for a permanent control of the rich traffic with the Pacific coast and with China and Japan.

The most recent achievement of this enterprising corporation is the lease of the roads and canal of the United Companies of New Jersey. The Pennsylvania road thus perfects its complete control of one of the great routes of commerce between New York and the West, and gets possession of our chief means of communication with the South. The main line of the Pennsylvania road from Philadelphia to Pittsburg is 344.9 miles. The branch lines are about 50 miles and the leased lines 197 miles. These lines amount to 601.6 miles, and the total track they have in operation is 1,136.5 miles. The leased lines, whose capital and operating accounts are not included in the returns of the Pennsylvania company, amount to 1,947.2 miles, and their total track to 2,311.7 miles. This company also owns a majority of the stock of the Cumberland Valley and Northern Central Railroad Companies, as well as 16,545 shares of the Harrisburg & Lancaster company; 25,547 shares of the Connecticut company; 31,636 shares of the Philadelphia & Erie company; 70,251 shares of the Pennsylvania Canal Company, and a considerable amount of other railroad and municipal stocks and bonds. The total amount standing on the books of the company, as

representing these investments, was, Jan. 1, 1870, \$20,055,741 93.

In May, 1871, the Pennsylvania company took a lease of the works of the United Companies of New Jersey, for the term of 999 years, agreeing to take the property and franchises of these companies and to assume all their obligations, and pay 10 per cent per annum on their share capital. The United Companies comprise the New Jersey Railroad & Transportation Company, the Camden & Amboy Railroad Company, the Philadelphia & Trenton Railroad Company, and the Delaware & Raritan Canal Company. Their leased lines, which will also pass under the control of the Pennsylvania company, extend over nearly every county in the southern half of New Jersey; and the extensive improvements at Harsimus cove in Jersey City will be resumed and finished on a larger and more complete scale.

The net revenue of the road has risen from \$3,500,000 in 1861 to \$5,250,000 in 1868, \$5,000,000 in 1869, and \$6,250,000 in 1870. The dividends were 1861 6 per cent.; in 1862 8 per cent.; in 1863 9 per cent.; in 1864 10 per cent.; in 1865 10 per cent.; in 1866 9 per cent.; in 1867 6 per cent.; in 1868 8 per cent.; in 1869 10 per cent., and in 1870 10 per cent. How far these earnings may be increased or sacrificed by the recent union with the New Jersey roads remains to be seen. These corporations consist of a union of the Delaware & Raritan Canal, the Camden & Amboy Railroad and the New Jersey Railroad. The first two were united forty years ago, and all are now parts of this grand Titanic confederation of railroads, which aims at no distant day to hold in its grasp the whole of the through route of transportation from New York to San Francisco, and thence to control the vast lucrative commerce of India and the Orient.

There have been some threats of opposition to the absorption of the New Jersey roads into this union. And there is no doubt that the stockholders of these companies could give trouble if they so desired. One objection which has been raised to the lease is that there is no penalty for its violation. If the Pennsylvania company, like so many other great over extended corporations, should become impoverished and fail to fulfill its obligations to pay 10 per cent interest on the capital stock, the stockholders complain that they have no redress.

The chief objections to the new arrangement come, however, from the rival companies, or are made on behalf of the interests of the public. Already a rival combination is spoken of which will prove, if carried out, a formidable competitor for the most lucrative part of the business, of which the Pennsylvania Central seems to aim at obtaining the monopoly. In this competition, indeed, is one of the chief safeguards of the public against the evils of huge confederations. These evils are twofold: first, political; secondly, commercial. How great the political evils may prove to be, we can as yet but faintly perceive. It is easy to see that a great, rich corporation, controlling millions of dollars and thousands of voters in several States can be so managed by shrewd men as easily to obtain, if unchecked, an influence in the State legislatures, and even in the National administration, hostile to the public interests and destructive to good government. The history of this country, however, is full of examples of the elasticity with which our free institutions adapt themselves to circumstances, and of the fertility of resource with which our national life

protects itself and controls or avoids the most formidable dangers. These political evils, therefore, must, like so many others, be left to evoke their own cure; and they will, in all probability, prove much less formidable than has been anticipated.

As to the commercial evils of these great railroad monopolies, they are more obvious and admit of more certain treatment. If a railroad has the absolute control of any route of travel it will certainly charge extortionate rates. But rival lines will be created by the very extortion, and in any case our railroad system is too far completed to allow of this monopoly on the chief through routes. It will be confined to local traffic, and will then have but a short-lived career. As a partial preventive of these and other classes it has been proposed to compel the railroads to publish weekly a full and trustworthy statement of earnings. This is done by the English railroads. If it were enforced here, the light of publicity would offer a partial but valuable check to some of the evils to which we have referred. It is very fortunate that this outcry against monopolies and the growth of vast corporations which has provoked it, did not spring up till our railroad system was sufficiently extensive to render impossible many of the worst evils of monopolies. And, moreover, the concentration of large masses of capital in a few hands, is both a result and an indispensable condition of that rapid material progress which is now in its incipient stages, and is destined in its fuller maturity to render monopolies more difficult and competition more free.—*Chronicle*.

ELECTRIC BELLS ON THE BOSTON & ALBANY RAILROAD.—The Boston & Albany Railroad Company is giving a trial to the system of electric bells invented by Mons. Pierre Prod'homme, of Paris. It is applied to a train running from this city to Worcester, and yesterday was attached to the 1.30 P. M. train. By this instrument communication is established through a train of cars from the locomotive to the hindmost car. It is attached to the couplings in an ingenious manner, and can be manipulated so as to separate one car from another. By a simple pressure of the finger a bell is made to ring in either car from and to the locomotive. In case of danger, or for other reasons, the utility and convenience of this system is apparent. The fact that it has been applied to 22,000 cars in France, and nearly as many in England, shows its real value. Though used in France and England very extensively, it has never until the present been applied in this country. Superintendent Firth saw the merit of the system while in Europe, and it is chiefly through his influence that it is now having a trial.—*Railway Times*.

COAL IN ALASKA.—A San Francisco despatch announces the discovery on the mainland of Alaska, and in the Alutian islands, of immense deposits of canal coal of the most valuable description, in the immediate vicinity of a good harbor. A company to work the deposits has been formed in San Francisco.

TENNESSEE IRON.—Certain Pennsylvania capitalists, who purchased a tract of land in Alabama containing immense quantities of iron, propose to furnish the Southern Pacific Railroad with all the iron required to lay its track, and the construction of its engines and car wheels, for ten dollars a ton less than it can be done elsewhere, either in Europe or America.

The New Jersey Railroads.

In connection with an exhaustive article on the extent, earnings and capital of the Pennsylvania Railroad in the *New York Tribune*, is the following resume of the New Jersey branches which are to be absorbed by this aggressive corporation.

There are few railroads whose workings are more complicated than those of what is called "The United Companies of New Jersey." They consist of a union of the Delaware & Raritan Canal, the Camden & Amboy Railroad, and the New Jersey Railroad. The first two were united as far back as 1831.

The whole series of roads, including the Philadelphia & Trenton, own the following property:

1. Sixty-five miles of canal, connecting the Delaware with the harbor of New York, and forming a part of the chain of inland navigation from Chesapeake bay to Long Island sound and the northern lakes, and also forming the main water outlet from the Schuylkill and Lehigh coal fields to the Eastern States. It is navigable for vessels of 250 tons.

2. Two main lines of railroad, forming two routes between New York and Philadelphia, one of which connects with the railroads leading south and west from Philadelphia, and the other with the railroads through Southern New Jersey. These lines and their branches consist of 165 miles of railroad, of which 104 miles are double-track, with 60 miles of sidings.

3. Terminal, station, wharf and ferry property, shops, dwellings for employees, and other real estate, outside of the right of way, worth now upward of \$6,000,000.

4. Rolling and floating stock, including upward of thirty steamboats.

5. A controlling interest in 260 miles of auxiliary roads, of which 35 miles are leased, and in bridges, ferries, horse railroads, &c., used in connection with main lines. They also lease and operate 31 miles of other railroads, including the connecting railroad to West Philadelphia and the line from Camden via Pemberton to Hightstown, N. J.

The United Companies, in short, own, operate or control 65 miles of canal and 456 miles of railroad, and including double track, 106 miles, and sidings, 74 miles—in all, 636 miles of track.

The rolling stock consists of: Locomotives, 128; cars—passenger, 193; baggage and mail, 40; house and stock, 612; platform mail and line, 478; total, 1,323. This does not include the stock of auxiliary roads.

The floating stock is, Steamboats—passenger, 3; ferry, 12; freight, 4; towing, 14; total steamboats, 33; freight barges, 5; car-floats, carrying 8 to 10 freight cars each, 10; schooners, 20; coal barges, 21; canal boats, 77.

The total receipts for 1869 were \$7,612,989 70. Of this \$2,835,422 70 was for passengers, \$2,785,541 43 for freight, and \$1,043,865 64 for canal tolls. The net profit was \$1,578,154 60. Two dividends, each five per cent., were paid in 1869. The total of the stock, bonds, debts, &c., is \$33,693,694 81. Of this \$4,999,600 is stock of Delaware & Raritan Canal, \$5,000,000 stock of Camden & Amboy Railroad, \$6,250,000 stock of New Jersey Railroad, and \$12,601,401 funded debt.

The Camden & Amboy monopoly owned New Jersey so absolutely and used its privileges so ill, that most of us are pleased at its virtual extinction. But here is a huge corporation whose control extends not merely over a little State like New Jersey, but a great commonwealth like Pennsylvania. It succeeds to the rights of Camden & Amboy over the

Legislature at Trenton. It molds, as recent experience has shown, the Legislature at Harrisburg. Its influence in Ohio and Indiana threatens soon to become formidable; and it is making rapid advances southward. We may well ask ourselves with some anxiety whether the Pennsylvania Railroad is hereafter to appoint Congressmen and Presidents, and whether anything can be done to regulate the power of these great corporations before it is too late.

Louisville & Nashville Railroad.

The extension of the Louisville & Nashville Railroad, and the great increase of labor and responsibility of its officers consequent thereto, induced the board of directors to appoint two vice presidents. On the 8th of April last Hon. Judge Houston was elected first, and Mr. Albert Fink second vice president. A few days ago Judge Houston resigned his position as vice president, and Thomas J. Martin, Esq., was elected to fill his place. During the temporary absence of the president, Mr. Martin will attend to the duties of his office. Mr. Fink is in general charge of the operation and construction of the roads under the control of the company and its connections, and Judge Houston retains the position of general attorney for the company.—*Courier-Journal*.

If all railroads had as much practical skill, talent and integrity at their command as the Louisville & Nashville Railroad has in the person of its second vice president, Mr. Albert Fink, there would be a great many more of them in a condition "above suspicion."

INDUSTRIES OF AUSTRIA.—The following are late statistics of the industry of Austria. In that country about 8,000,000 persons are engaged in mechanical and manufacturing pursuits, whose annual productions amount to about \$653,000,000 gold. Of that number of persons about 4,000,000, who live chiefly in Bohemia, Moravia, Silesia, Galicia, Bukovina, Hungary and Transylvania, are weaving linen, annually producing fabrics worth about \$70,000,000. Woolen goods are produced by about 400,000 persons in 268 factories to the annual amount of \$65,000,000. In 154 cotton factories 350,000 persons produce annually fabrics to the value of \$56,000,000. Iron bars (3,500,000 cwt.) and iron rails (1,750,000 cwt.), to the amount of \$37,300,000 per annum, are made in Styria, Carinthia, Bohemia, Moravia, Hungary and Lower Austria. Articles of food are manufactured by about 250,000 persons. Austria numbers 50,000 flour mills, 300 beet sugar refineries, 3,200 breweries, and 105,000 distilleries. Leather ware is manufactured in 7,800 factories by about 230,000 persons, and its value per annum is \$46,500,000. Earthen ware is manufactured by about 50,000 persons, and worth per annum \$11,600,000. Glass, chiefly produced in Bohemia, is made in 300 glass houses by about 60,000 persons to the annual amount of \$9,566,000. Chemical products of the annual value of \$23,300,000 are manufactured by about 50,000 persons.

ATLANTA & RICHMOND AIR LINE RAILROAD.—A proposition is to be submitted to the voters of Anderson county, S. C., on the first Monday of August, for the county to subscribe \$300,000 to the capital stock of the above company.

**Chicago, Rock Island & Pacific Railroad,
1870-71.**

The annual meeting was held on June 2, at the company's office in Chicago.

The president congratulates the company, as well he may, on an increase of business, regularity and safety of operation, and material decrease of operating expenses. The public, it is grateful to say, share in congratulations on results in operating economy that have brought corresponding reductions in charges to the advantage of producers and shippers along the line.

We present statements of receipts and expenditures during the year ending March 31, 1871:

GROSS RECEIPTS.

Passengers	\$1,713,123 16
Freight	4,023,271 60
Mails	83,190 63
Express	83,543 70
Rents	82,820 42
Int. on loans, &c.,	42,337 78

Total\$6,028,287 29

EXPENSES.

Operat'g expenses	\$3,218,610 43
Legal	24,884 43
Taxes on r'l estate	
and U. S. Gov...	161,964 20

Total 3,405,459 06

Net receipts\$2,622,828 23

Rent on P. & B.	
Val. Railroad...	\$125,000 00
Interest on bonds	617,751 75
Dividend, includ'g	
taxes	1,229,466 00

Total 1,972,217 75

Surplus earnings \$650,610 48

Percentage of operating expenses	
to gross earnings.....	53 39-100
Percentage of operating expenses	
to gross earnings, includ'g taxes	
and legal expenses.....	56 50-100

The gross receipts, compared with those for 1869 70, show a large increase. The operating expenses, compared with those of the previous year, \$3,456,791 24, show a decrease of \$51,332 18.

In connection with the above very favorable result of the entire operations of the road, it should be noted that the total increase in transportation earnings amounted (exclusive of interest, etc.) to \$385,292 10—the increase in freight earnings being \$136,269 40, or 12½ per cent. Among principal items of outlay included in the above statement of expenses were: land and land damages, \$589,843 65; equipment, \$349,369 04; grading, including masonry, \$229,724; superstructure, bridging and second side tracks, \$122,660 54; station buildings, etc., \$132,342 89; fencing account, \$102,098 77; the total expended on these and on quarrying for ballast, water supply, new shops at Chicago, bridging at Rock Island and engineering, amounting to \$1,718,184 57. The equipment has received additions of 18 locomotives (12 received and 6 building), and 1 day, 2 sleeping and 210 freight cars. The equipment now numbers 145 locomotives, and 3,058 cars. Another freight depot has been erected at Chicago, 60x600 feet; and the new fence amounts to 275 miles board and 25 wire.

In maintenance of permanent way there have been put down 110,979 ties, 2,873 tons re-rolled iron, and 3,011 tons steel; and 18,876 rails have been repaired in the shops. Track has been laid as follows:

	Miles.
Re-rolled rails	30.46
Steel rails	33 24
Steel-capped rails.....	1.13
Total	64.83

The road now has 63 14 miles of steel rail. The total of miles of track is now 719—side and second track, 129; main and branches, 590.

In connection with the present high value of the stock of the company, increasing steadily of late in the market, a resume of President Tracy's report relating to the operations of the land department is especially significant:

The land commissioner reports that the grant has been pretty much adjusted; that during the year he has received from the (United States) Interior department certificates for 160,373 10 100 acres under the act of Congress of June, 1864, which is all claimed, except some few scattering tracts now in course of investigation at Washington. Sales have been made during the past year of 28,022 8 100 acres for the sum of \$213,575 39—an average of \$7 63 per acre. In addition to this there has been received something over \$4,000 from compromise of the title to about 2,000 acres of "Rejected Swamp Selections," referred to in the last annual report. The sales have been made almost exclusively to actual settlers, in small tracts; and farms are being opened upon nearly every tract. The market price of lands has increased during the past year in nearly all the counties where the company's lands are situated; and it is expected that the average price of lands sold during the coming year will be fully \$8 50 per acre.—*Chicago Railway Review.*

METROPOLITAN BRANCH OF THE BALTIMORE & OHIO RAILROAD—A letter from Point of Rocks, Md., to the Washington *Chronicle*, speaks encouragingly of the progress of the work on the Metropolitan Branch of the Baltimore & Ohio Railroad, which, as is well known, is a direct line from Point of Rocks to Washington city. The *Chronicle's* correspondent thinks that before the 1st of next January this entire line will be completed. Mr. Randolph, the engineer in charge of the work, thinks before that time it will be in good running order. Large numbers of cross ties are being distributed along the line, and 1,500 men and more than 300 horses are pushing the work through. Soon the iron will be brought on, and the work of laying the track commenced. Some difficulty is experienced in getting cut stone for bridges, but all streams will be trestled until stone can be obtained, so as not to delay the work. The best of iron will be laid upon this route, so as to make it first class in all respects.

IMPORTANT CONTRACT.—The Danville (Va) *Times* states that parties interested in the Pennsylvania Central Railroad have concluded a purchase of a large part of the State's interest in the Richmond & Danville road. The *Times* is gratified at this, as it will insure a great through line from New York to New Orleans through Danville. But it may be borne in mind that the extension of the Orange & Alexandria Railroad from Lynchburg to Danville, now under construction, accomplishes the same end over a shorter route.

A New Method of Straightening High Chimneys.

It is so frequently the case that the chimneys of our large mills and manufactories, owing to faults in the construction, or other causes, become inclined from the perpendicular, entailing great expense and trouble in remedying the evil, that any new device for accomplishing this object must prove a matter of interest. The following account, condensed by a foreign paper from *Zeitschrift für Bauwesen*, explains a method lately adopted with much success in Germany:

It is a well known fact that high chimneys, however carefully built, often lose their original straightness soon after their erection and assume an inclined position or a curved shape, so that it becomes necessary to straighten them. Recently, a very high chimney, erected in chemical establishments at Barmen, Prussia, was successfully straightened by a new method. This chimney is 331 feet high. Its exterior shape is octagonal, with a clearance of 8 feet throughout its whole length. This gives it an interior sectional area of 33 square feet. The socle is quadratic in section, 20 feet wide and 40 feet high. The upper or pyramidal part of the chimney is octagonal, 291 feet high. The exterior diameter of the latter is 17 feet at the base of the pyramidal part. This diameter is reduced 2½ inches on every 10 feet upward. The masonry is 7 bricks thick in the basement, 5 at the base of the pyramidal part, and 2 at the top. In the spring of 1868, remarkable for vehement and long continued gales and storms, this chimney suddenly assumed an inclined position toward the north-east. The deflection of the chimney was considerable at the end of May, and seemed yet to increase, and threatened an overthrow. Some layers of bricks in the chimney at distances of 50 feet from each other were painted black outside. The height of these black lines above the socle being known, these lines were, by means of a theodolite, projected on a plank situated on the socle of the chimney, to find the deviation from the vertical line at these different heights. It was thus ascertained that the chimney at a height of

251 feet was out of line.....	45 inches.
210 " " "	30 "
160 " " "	16 "
110 " " "	5 "

The socle stood perpendicular. As the deviation was still increasing, and as it would have done too serious an injury to the manufactures of the establishment to set the chimney temporarily out of use, it was necessary that immediate action should be taken in the matter. The ordinary method of straightening chimneys was resorted to. A hole was made through the whole thickness of masonry on that side of the chimney which required lowering four feet above the top of the socle. Into this hole a saw was introduced with which a horizontal cut through one-half the chimney was attempted. But as the thickness of the wall was considerable, and the bricks hard, and as the saw could be manipulated from one of its extremities only, the effect of sawing, after two hours' work, was scarcely perceptible. The hole through the chimney having been made without trouble, and the difficulty experienced in sawing, led to the idea to gradually remove a whole layer of bricks, replacing it by a thinner layer, thus to produce the desired slit. Before, however, this operation was performed, the experiment was made with an old inclined chimney 120 feet

high. When the method had there proved practicable and successful, it was concluded to treat the new chimney the same way. A layer of bricks was broken out by means of pointed cast steel bars, from 1½ to 5 feet in length, and flat shovels, with long handles, were used to lay those bricks which had to be placed near the inside of the chimney. A space of five inches was left each time between the newly laid bricks and the old ones of the next division, to break out the latter with greater facility. As soon as the operation was performed, the chimney began to move, and by slight oscillations settled down on the new layer of bricks, and there remained quiet.

Japan Tea.

In the year 1848 Japan exported over a million pounds of tea, although of an inferior quality; since this it has very much improved, as we have seen by the six different experiments with green and black teas at the last Exhibition in Paris. Reunion likewise forwarded samples of excellent quality, produced from plants which the French procured from Japan; and the Pekoe sorts were equal to any of the same descriptions of China tea. We are convinced that Japan teas, of the quality of which the Japanese have reason to be proud, will in time have a great influence on the European markets. The tea plant is called, in Japan, *Tsija*, and cultivated not as elsewhere, in large gardens and plantations, but merely on the banks of lakes and rivers. The first harvest takes place towards the end of February. The newly plucked leaves are collected in paper bags, and dried with the greatest care and ceremony; they are not sent out of the country, but are stored up in porcelain jars of enormous value, and the handling of them is only permitted with gloves. The second harvest takes place towards the end of March or the beginning of April. The third, and most plentiful, follows a few weeks later, when the leaves have obtained their full development. The quality of the tea generally depends upon the age of the leaves, the youngest of which are the best. The earliest leaves are called *Iziban*; those of the second harvest, *Niban*; and those of the third harvest, *Sanban*. The finest qualities are ground to powder, and so stored up. Four qualities of *Niban* are distinguished. The *Sanban* sorts are similar to the tea exported by China to Europe. The last quality, which is consumed by mechanics and peasants, is called *Bantsjaa*, and it suffers no change when exposed to the air, while with the better sorts the contrary is the case. The finest specimens for the emperor's court are grown on a hill near Miako, in a position especially adapted for their cultivation.

Great care is always paid to the thorough drying of the leaves, and we think that the Chinese might here take a lesson and improve the tea sent to us. We also notice that the Japanese employ snow water, or rain water if the former is not to be had, and such water develops the aromatic properties of the tea more than spring water. In Japan the island of Riton, especially, produces a large quantity of tea. Nagasaki furnishes more of the ordinary and middle kinds, while Yokohama yields both fine and middle descriptions. The finest tea comes from Yamasiro or Darjee, and does not appear on the market till the beginning of September. The districts of Gushoo and Hadchidi produce good tea, but in small quantities.—*Wellthandell*.

Hardening of Rails.

At Demitoff's works in Salda Nischne, some years since, it was accidentally discovered that ordinary iron rails gain essentially in hardness by sudden cooling. Want of room in the mill necessitated the removal of a part of the rails, while still red hot, to the outside of the building where the ground was covered with snow. Subsequent experiments made by the commission appointed by the Government to test the rails, revealed the fact that the rails thus suddenly cooled were harder than those gradually cooled, and since this time all the mills in Russia harden their rails by cooling in water.

In the works of Von Putilow, near St. Petersburg, rails with mild puddled steel heads are allowed to cool in the air until they cease to be luminous, before immersed in water; but in other mills rails of hard iron are plunged into cold water immediately after leaving the saws.

As these rails are found perfectly reliable in Russia, where the temperature in winter is often 40 to 60 degrees below zero, there can be no question of their applicability elsewhere.

The danger of fracture in good hardened rails depends obviously only on the degree of hardness, and this depends only on the amount of carbon present in steely irons, and on the temperature at which the hardening is effected, and there can scarcely be any tenable ground why rails should not be hardened while many other articles are, in which fracture is equally to be feared.

The hardening effected by sudden cooling is indisputably less dangerous than that imparted by phosphorus, and in case of iron free from impurities, when we compare rails hardened on the one hand by the addition of carbon (approaching steel in composition), and on the other by sudden cooling, the advantage of safety would undoubtedly be in favor of the latter—to say nothing of the expense of manufacture.

In this connection may be mentioned that at Salda Nischne, and also at Wolkinsky, a photo-meter, the invention of Director Palanow of the former works, is in use to determine the temperature of the rails after leaving the rolls, by the amount of light emitted, so that the ends may be sawed off at a proper temperature, thus securing perfect regularity in the length of the finished rails.—*Translated for the Bulletin of the Iron and Steel Association, by Thomas M. Drown.*

In 1861 the value of American shipping engaged in foreign commerce was estimated at \$108,000,000, and the gross earnings therefrom \$36,000,000. In 1869 its value had fallen to \$70,000,000, and its earnings to \$23,000,000. In 1860 the American tonnage entering our own ports from abroad was in excess of foreign tonnage entering our ports by 3,567,374 tons. In 1863 that excess had fallen to 1,974,320 tons. But in 1869 the relative positions were reversed, and the excess was on the side of the foreign tonnage by 1,945,026 tons. In 1860 the value of imports and exports carried in American vessels was double that carried in foreign vessels—\$507,000,000 to \$255,000,000. In 1869 the positions were reversed—\$586,000,000 in foreign vessels to \$289,000,000 in American vessels.

—The stockholders of the Nashville & Decatur Railroad have ratified the lease of their road to the Louisville & Nashville Railroad.

Woolen Manufactures in the West.

We hear some flattering accounts of the progress of woolen manufactures in Michigan. It is said some old factories of small dimensions, which have lain idle since a former speculative season in woollens, will be reset agoing this year. This looks well for progress in Michigan, and shows that the home demand for our woollens is advancing, slowly perhaps, but surely.

Some of our manufacturers of cloths and tweeds are progressing to a point where we may soon expect to perceive them touch the excellencies of the Eastern manufactures. In the last month or so, some cassimeres have been sent to this city from Flint, which greatly exceed anything thrown upon the market before. The texture appears to have greatly improved, showing more care this season than last on the part of Michigan farmers. They appear to have taken the greasy matter out of the wool by a little more attention to the cleaning of the fleece. Hence a finer quality of tweed has been produced, which, under the hands even of the inexperienced, has a soft, velvety fineness, greatly ahead of the brittle, hard, earlier productions. These finer productions are sold, also, at prices far below the old ones, though the quality of the goods is so much superior. In regard to wool, it is plain that manufacturers will not advance upon present rates, which have started up from 2½ to 5 per cent. The California wool will come along in good time, to ease the market a little. Then a cessation of work, or a slack in it for a little time, will put things on their old footing.

In any case, the present scarcity will readily disappear when the new clip comes into market, and in the meantime it seems contrary to experience that enough of wool should not be in reserve to meet the moderate demand of the next two months. Speculators always hold over some choice lots until late. Manufacturers understand this, and will not be likely to set too high a value on their own fabrics, much less to submit to any exorbitant demand from producers. Even as it is, we are informed that several Eastern manufacturers, of large means, have met agents abroad, in anticipation of combination at home.—*Exchange.*

Mr. E. Weare, of Stonehouse, England, has patented a method of utilizing waste thread in the manufacture of textile fabrics. He accomplishes the end sought by returning the waste threads to the condensing carding engines by means of mechanism, the greater part of which is attached to one of the scribblers, by preference to the last. Over the end of the carding engine, rollers are fixed, over which rollers the waste thread from one side of the engine is conducted to the other side, and the threads from the two sides of the engine thus brought side by side. The waste threads are taken up by or coiled upon a roller or spool driven by any convenient gearing from the carding engine or otherwise; and the said roller or spool, when filled with the waste threads, is conveyed to the scribbler (the axis of the roller or spool placed in suitable supports), and made to bear or rest on a second roller or drum, which has a slow, uniform rotary motion communicated to it, whereby the waste threads are uniformly delivered into the sliver as it comes off the scribbler. The sliver passes to the condensing carding engine in the usual way.

How to Paint Brick Buildings.

In all our large cities, brick must continue to be the article most in use for constructing the walls of buildings, for the reason, if for no other, that the laws forbid the use of more combustible materials. The porous nature of this material and the mortar in which it is laid up is the only serious obstacle to its entire success as a building material possessing the grand requisites—beauty, durability and economy.

The moisture of our winter atmosphere with the changes of temperature, are continual causes of the disintegration of exterior brick surfaces. The water which during a thaw or winter rain storm finds its way to all the exposed interstices of a wall, and the freezing temperature which so quickly succeeds destroys the cohesion of the particles. The great desideratum in this connection is some material which, being applied at not too great a cost, shall render the exposed portion of the surface entirely water proof. Up to this time oil painting is the only process which has been in any degree successful; and this brings us back to the important question, how to paint exposed brick surfaces? Pure white lead is of all known pigments the most expensive and least durable for this purpose. It soon disintegrates under the influence of sunshine and storm, and loses whatever waterproof character it may have possessed when first applied. Therefore it should not be used on brick work except when a white surface is absolutely required.

It must be borne in mind that paints are durable mainly because of the water proof quality of the oil in which they are used. The natural pigments—called ochres or earth paints—do not in any degree act upon the oil; while others, as white-lead and the chromates of lead do affect the oil chemically and impair in a measure its tenacity or waterproof quality. When work is painted simply to preserve it from the action of the weather, color and appearance are frequently unimportant considerations; and whatever material will most economically realize the desired result is most desirable. The deposits of ochre were deposited in ages long past; and it is reasonable to suppose that if these materials had been liable to change, the change would have taken place during the ages that they remained unappropriated to the use of man; but experience teaches that they are not subject to those changes which belong to most of the artificial products used in painting.

These premises being admitted, it follows that the natural pigments are not only the most economical but the most durable for painting brick houses. It is an important question how and where the proper materials can be obtained with a fair prospect of tolerable if not absolute purity. As a rule, the respectable, established master-painters of the cities use the very best materials: but outside the cities the services of city skilled workmen are not readily obtainable, and the owner must avail himself of such labor as he can command. It is not safe to purchase a package of paint which does not carry with it the name of some respectable manufacturer as a guarantee of its quality. The writer's experience demonstrates the fact that the most durable paint for brick painting is a mixture of finely ground French yellow ochre mixed with an equal quantity, by weight, of American white zinc. The color is a soft shade of buff, most pleasant to the eye, and permanent to the last degree both in color and material. Venetian red, an artificial ochre, or red oxide of iron, is in common use; but it does not hold oil like the yellow ochre, and makes a coating far less water-proof. It is a seemingly durable paint because the stain which it imparts to a porous

surface remains long after the oil has been washed away. It can not be used with white zinc, because of the unsuitable pink tint it produces; and because this pigment (Venetian red,) when tinted with white, becomes highly fugitive in color.

The condition of the wall is also very important in painting brick surfaces. The work should be done in dry, warm weather, when the moisture which bricks absorb during the winter and spring seasons has dried out; otherwise the paint will not be apt to adhere tenaciously but will scale or peel off. The joints in the stone coping on brick walls require constant looking after. These should be made absolutely impervious to water by the application of a mass of soft paint-skins both on the top and edges; and when this hardens to the point of cracking, it should be removed and renewed. Mortar and cement for such purposes are altogether useless. The joint, too, between the wall and the coping underneath should be well filled with paint-skins before painting; for no matter how waterproof the surface may be, if the water be allowed to percolate through the joints in the coping, the integrity of the wall will be destroyed.

A paint into which carbolic acid enters as one of the component parts has recently been discovered, and some exposed brick walls of considerable extent have been coated with it. It is now undergoing the test of time and atmospheric changes. The inventor has not a shadow of doubt as to its entire success; but declines to put the material upon the market until by actual trial its durability shall have been demonstrated. If the hopes of the inventor should be realized, the question how to paint brick houses will receive a new and satisfactory solution.

In the mean time, it will be well to bear in mind the fact that good results in painting are possible only by the use of good materials. The best of the kind are always the cheapest.

TIN—WHERE OBTAINED.—Tin is one of the most valuable of metals and its use constantly increasing. In a pure state it possesses no properties injurious to health. Its ores are not so widely and generally distributed as the ores of iron, copper and lead, but in certain localities immense deposits of this beautiful metal are found. In Cornwall, England, tin mines were worked before the invasion of the island by the Romans, and the mines of this district are the most important in the world. Tin ores of a very fine quality are also found on the Malay peninsula: Banca in Asia, and in Bohemia and Saxony in Europe. They also exist in Mexico in small quantities. Tin ores are found in veins, or in detached masses in alluvial soils where they have been carried by the action of water. The latter ores are hence called stream tin. The examination of the deposits of stream tin frequently leads to the discovery of the principal vein from which the broken mass of ore has drifted. The present commercial tin is the celebrated Banca tin, brought from the island of Banca, which lies east of Sumatra. This tin is employed in the manufacture of the finest bells. It is almost chemically pure; English tin is more or less contaminated with arsenic, iron and lead. —*Exchange.*

Any hard, steel tool, says the *Boston Journal of Chemistry*, will cut glass with great facility when kept freely wet with camphor dissolved in turpentine. The ragged edges of glass vessels may also be thus easily smoothed by a flat file.

California has 40,534 orange trees, 7,851 lemon trees, 45,655 fig trees, 29,000 olive, 41,815 almond, 12,474 prune, and 39,438 English walnut trees.

THE SPECTROSCOPE IN STEEL MANUFACTURE.—The science of astronomy is not alone to be benefited by this marvelous instrument, for we learn that during the past few months, almost simultaneously in England and in America, it has been brought into use in the manufacture of Bessemer steel, to aid in determining the right moment at which the fusion of the metal is complete and it is ready for casting. By means of this instrument the flame issuing from the furnace containing the steel is analyzed and the spectrum is watched until it is seen to change its color to a deep crimson—a change which indicates with invariable accuracy that the precise moment has arrived for shutting off the blast and for commencing to cast the metal.

It was, however, for some time found impossible to determine with accuracy the state of the molten metal when manganese was present in the iron; but science has at length triumphed over this difficulty, and an instrument called a chromopyrometer has been devised, consisting of a combination of colored glasses, two being ultramarine blue and one dark yellow, which so accurately indicates the state of the metal that it is said an ordinary workman may be entrusted with its use.

This is a remarkable and unique application of an instrument which has already proved of inestimable value to the scientist, and we hail with pleasure its introduction in the important branch of our manufactures, believing that it is but the opening of a field of scientific investigation which may be attended with important results in the manufacture of steel.

CAVEO CUTTING.—Rome is now the chief seat of the art of cameo cutting, two kinds of which are produced—those cut in hard stone and those cut in shell. The stones most valuable for this purpose are the oriental onyx and the sardonyx, provided that they have at least two different colors in parallel layers. The value of the stone is greatly increased for this purpose if it has four or five differently colored parallel layers, if the layers are so thin as to assist in marking the device of the cameo. For example, a specimen of stone which has four parallel layers may be useful for cameos of Minerva, where the ground would be dark grey, the face light, the bust and helmet brown or grey. All such cameos are wrought by the lapidary's lathe with pointed instruments of steel, and by means of diamond dust. Shell cameos are cut from large shells found on the African and Brazilian coasts, and generally show two layers, one white and the other a pale coffee color or deep reddish orange. The subject is cut with small steel chisels out of the white portion of the shell. Shells adapted for cameo cutting are dense, thick, and consist usually of three layers of different colored shell material. In one variety of these shells each layer is composed of very many thin plates, that is laminated—the laminae being perpendicular to the plane of the main layer, and each lamina consisting of a series of elongated prismatic cells, adherent to their long sides. The laminae of the outer and inner layers are parallel to the lines of growth, while those of the middle layer are at right angles to them. In another variety, known as the cowries, there is an additional layer, which is a duplicate of the nacreous layer, formed when the animal has attained its full growth.

There are four ranges of hills, each about twenty miles long, parallel with the Menominee river in Wisconsin, which were recently discovered to be almost solid iron, and are estimated to contain ten times more metal than the whole of the Lake Superior ranges combined.

Railroad Items.

— The Louisville *Ledger* says: The stockholders of the Elizabethtown & Paducah Railroad held their annual meeting at the office of the company, in Louisville, on Saturday. After reading the reports of the various officers, showing the company to be in a flourishing condition, the following gentlemen were elected directors for the ensuing year: W. H. Dulaney, S. B. Thomas, R. A. Robinson, J. S. Lithgow, T. L. Barrett, Dennis Long and Jas. Trahue. The road is doing a very good business. When it is opened to Greenville, it is expected that the receipts will be nearly doubled. At Rockport, 77 miles from Elizabethtown, there is a fine quality of coal, large quantities of which will be taken out daily. There are several Fink bridges, and one of the Baltimore Bridge Company's patent, the largest one between Elizabethtown and Greenville. It spans the Big Clifty. There are 23 stations on the road, as follows: Elizabethtown, Cecelia, Long Grove, Stephensburg, East View, Big Clifty, West Clifty, Grayson Springs, Litchfield, Millwood, Coneyville, Spring Lick, Horse Branch (present terminus), Pigeon Roost, Elk Lick, Beaver Dam, Hamilton, Reeder, Rockport, Green River, Nelson Creek, Ownesboro Junction and Greenville. The country is rolling, and any quantity of timber all along the road.

— The Cincinnati & Springfield Railroad Company paid into Court, at Dayton, on the 26th inst., \$19,900 for the ground appropriated by the company for passenger depot purposes. The location is on the up-town side of the Cincinnati, Hamilton & Dayton company's depot, between Ludlow and Wilkinson streets, giving the new road decided advantages.

— At a meeting of the stockholders of the Michigan Central Railroad at Detroit, June 26th, the following gentlemen were elected directors for the ensuing year: Jas. F. Joy, of Detroit; Jno. W. Brooks, Nathaniel Thayer, Sidney Bartlett and H. H. Hunnywell, of Boston; Erastus Corning, of Albany; and Geo. F. Talman, Moses Taylor, and John Jacob Astor, of New York. The present officers were all re-elected.

— A number of prominent railroad officials, representing the Pennsylvania Central, Toledo, Wabash & Western, Decatur & St. Louis, Chicago, Alton & St. Louis, Indianapolis & St. Louis, North Missouri, St. Louis, Vandalia & Terre Haute, Pennsylvania Company, Illinois & St. Louis Bridge Company and others, were in consultation in St. Louis on Monday last, in regard to the location of the Union depot, the construction of a tunnel from the bridge, &c., but no definite action was taken.

— The formal opening of the Pittsburg & Connellsville Railroad on the 26th inst., was celebrated by an excursion of the city council and prominent citizens of Baltimore, Cumberland and various points along the line of the road from Baltimore to Pittsburg. The excursionists were met at Cumberland by Mayor Brush and a committee of the city council, and a large number of Pittsburgers.

— At the annual election of the Milwaukee & St. Paul Railroad Company, at Milwaukee, on the 14th inst., the old officers were re-elected. The four directors elected for three years are, Alexander Mitchell, Russell Sage, Selah Chamberlain and Julius Wadsworth.

— The stockholders of the Connecticut River Railroad Company voted to lease the Mount Tom & East Hampton Railroad and guarantee its stocks and bonds to the amount of \$100,000.

— The decision of the United States District Court, placing the Alabama & Chattanooga Railroad in bankruptcy, was reversed, on the 26th inst., in the United States Circuit Court, at the cost of the petitioner below, and the road again ordered into the possession of Stanton & Co.

— Timber planting has been begun in Iowa with a zeal highly commendable, and some big work will be done, it is said, toward securing the premium offered by the State Agricultural Society for timber growing. One gentleman of Sioux City, it is stated, will plant 250,000 trees on his farm this year; another has commenced planting 250,000 trees in Lyon county, and still another is planting 30,000 trees—chestnut, larch, maple and cottonwood—in Ida county. At this rate Iowa will soon become a timber State. Tree planting is also being prosecuted at a lively rate in Nebraska. In one day 16,000 young trees passed over a single line of railroad. A company of Swedes have contracted for 12,000 cottonwoods to set out on their farms. This tree planting is now a regular routine of agricultural settlements, and can not fail to produce the most beneficial effect upon the climate and productive power of the State.

7-30 GOLD LOAN

OF THE

Northern Pacific Railroad

RAPID PROGRESS OF THE WORK.

The building of the Northern Pacific Railroad, (begun July last), is being pushed forward with great energy from both extremities of the line. Several thousand men are employed in Minnesota and on the Pacific coast. The grade is nearly completed 266 miles westward from Lake Superior; trains are running over 130 miles of finished road, and track laying is rapidly progressing toward the eastern border of Dakota. Including its purchase of the St. Paul & Pacific Road, the Northern Pacific Company now has 413 miles of completed road, and by September next this will be increased to at least 560.

A Good Investment. Jay Cooke & Co. are now selling, and unhesitatingly recommend as a profitable and perfectly safe investment, the First Mortgage Land Grant Gold Bonds of the Northern Pacific Railroad Company. They have 30 years to run, bear Seven and Three-Tenths per cent. gold interest (more than 8 per cent. currency) and are secured by first and only mortgage on the ENTIRE ROAD AND ITS EQUIPMENTS, and also, as fast as the Road is completed, on

23,000 Acres of Land to every mile of track, or 500 Acres for each \$1,000 Bond. They are exempt from U. S. Tax; Principal and Interest are payable in Gold; Denominations: Coupons, \$100 to \$1,000; Registered, \$100 to \$10,000.

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Exchanging U. S. Five-Twenties. The success of the New Government 5 per cent. Loan will compel the early surrender of United States 6 per cents. Many holders of Five-Twenties are now exchanging them for Northern Pacific Seven-Thirties, thus realizing a handsome profit, and greatly increasing their yearly income.

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The Railroad Record.

E. D. MANSFIELD, - - - - } Editors
T. WRIGHTSON, - - - - }
A. J. HODDER, - - - - }

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The New Railroads—From My Point of View.

There is no fact startles thinking minds more than that the United States has made 23,000 miles of railroad in the last ten years! During those ten years we had four years of costly war, carried on upon a vast scale. One would have thought there would have been no roads made except for military purposes. But the great North-west—that far country which is always growing, and which we are always hearing of, but which seems to be constantly going on—on—on—and is still the North-west—was all out of the war; and the stream of migration kept on, and the railroads were made to carry it on. So, while everybody in the old part of the country was thinking of the war, the frontier kept moving on, and the railroads were made to move with it. So, in ten years, there were actually made 23,000 miles of railroad, or an average of 2,300 miles each year. This railroad cost an average of \$45,000 per mile, or in the aggregate, cost \$1,035,000,000. This construction employed steadily 360,000 men each year; a part of which, but comparatively a small part, were in Europe, making iron. We may safely assume that 250,000 able-bodied men were employed in this country constantly in making railroads; many of them, of course, in the factories, making iron and cars. In view of this tremendous expenditure, we may ask where did the money come from? The railroads, like the Government, used credit liberally, but half the cost of these railroads was paid in gold. This, however, \$50,000,000, was a small fraction of the net annual gain of the nation.

The Government, for several years, levied on the country an annual revenue of \$400,000,000 per annum. The State governments must have levied \$50,000,000. Thus the Government and the railroads levied on an annual capital of \$500,000,000; but this was probably not over half the net gains of the nation. At this time the net annual gains to be reinvested must exceed a thousand millions, the calculation being made on the productive value of crops, rents and investments. We see, therefore, there was really no difficulty in accomplishing what was done. But there remains a curious fact, upon which we are about to comment. This is, that while 2,300 miles was the average annual result, in the last year there was made 6,000 miles. This fact shows that railroad construction is now rapidly increasing, and that the average construction for the next ten years is likely to be much greater than it was the last. The demands of the Government upon the country is reduced \$150,000,000 per annum. The reduction of the public debt has been, and with the abundance of money probably will be, \$100,000,000 per annum. The Government alone, by reducing its demands, adds \$250,000,000 per annum to the active capital for enterprises. Add to this the increased profits resulting from the employment of all labor now, in peaceful industry and the flow of immigration, and we see there is in the country an immense, constantly accumulating fund for new investments: It is for this reason that money is now becoming cheaper, with the probability that the rates of interest will go on diminishing. For this reason, also, it is probable that the increase of railroad construction will go on. We have demonstrated in this country that with a population of 50 to a square mile, railroads may be profitable at 1 mile of railroad to 15 square miles. We see, therefore, that even in the old States, railroads may yet be much increased. But, when we cross the Mississippi, we find that in Arkansas, Missouri, Kansas, Iowa and Minnesota, there may yet be made over 10,000 miles of railroads, without encroaching on the proper limit of construction; for while this construction is going on, these States will soon fill up to a population of 50 to a square mile.

But when we go beyond these States to the Central and North-western Territories, their extent and capacities are so great that we can now form no adequate conception of the amount of railroads they may require. We hazard nothing in saying that in the next twenty years there will be an annual increase of railroads to the extent of 5,000 miles per annum, or 100,000 miles. This seems enormous, but an examination into the movement and economy of the country will make this probable.

In the meanwhile we must notice here that the railroad construction in the old States and those which have most railroads, is still

going on. Take New York and Ohio as examples. Here in New York, there is the Midland road going on, which will be 200 miles. There is a railroad constructing on the west side of the Hudson to Kingston, and it now seems that the Hartford & Erie will be completed, which will go through Dutchess county to Fishkill on the Hudson. Now, go to Ohio. We have the Atlantic & Erie, from Toledo to Pomeroy, much of it under contract, making 200 miles. The Chesapeake & Ohio, continued to Cincinnati, will be made, making 130 miles. The Short Line is under contract, making 50 miles. The Dresden Cut-off, 20 miles, is nearly completed; and there are several others in this State spoken of with much confidence. We may be quite sure, that full 500 miles of railroad will be made in Ohio in two or three years coming.

In the same way, we see that Kentucky, Tennessee, Alabama, &c., must go on with their roads. In those three States not less than 3,000 miles will soon be made. Looking to these facts, it is evident that we are to have an immense amount of investment, of labor, of skill, and of development, in the next few years. We need only look in the advertising columns of newspapers to see that the tide of investments is in that direction. The bankers of New York are constantly offering new railroad schemes to the public, and as yet very successfully. More than half the great loan of the Chesapeake & Ohio is taken, and the completion of that work is placed beyond a doubt. It is much to be desired that the wealthy citizens of Cincinnati could see that the continuation of that road to the city should be made immediately. Here I may say, by the way, that the Chesapeake & Ohio have secured the Big Sandy & Lexington, so that you see at once, that nothing but a rousing up, actively and energetically, will save Cincinnati from being left out in the cold so completely that nothing can save her in the south.

I have no interest in either of these lines of roads, but it gives me a sort of distressed feeling that a thing so obvious, so plain and palpable for Cincinnati, should be neglected. It is said, *verbum sap.*, and if so, the inference is that Cincinnati is not wise.

Yours truly, E. D. M.

FISHKILL ON THE HUDSON,
June 28, 1871.

We have been asked the liabilities of the North Missouri Railroad. In the early history of the road the State of Missouri advanced the amount of \$4,500,000 in bonds, the proceeds of which were spent on construction. The State has surrendered its lien on the road therefor. Not including this sum, therefore, the obligations of the road amount to fully \$26,000,000—1st mortgage, \$6,000,000; 2d mortgage (under which sale is to be made), \$4,000,000; a 3d lien of \$5,000,000; common stock, \$8,500,000; floating debt, \$2,500,000. To the above should probably be added \$3,000,000 accrued interest. It is natural to presume that the purchaser of the road must assume the above responsibilities.—*Jour. Com.*

Blue Ridge Railroad.

We publish in to-day's issue a letter from Gen. HARRISON, the President of the Blue Ridge Railroad. Gen. H. does not overstate the case, in his eulogistic remarks relative to the importance of his road to the traffic of Cincinnati with North and South Carolina, Georgia, the West Indies and South America.

If there was any *railroad sense* in Cincinnati, it would not be necessary to make such an appeal to our citizens a second time. The case is too clear. But there is not; and that is the reason why even the railroads that we have got and partly paid for, have slipped through our fingers, and are now being used to force trade to fill the coffers of other communities more energetic and far-seeing than ourselves.

With two millions of *cash money*, in hand, we would contract to complete the road between Cincinnati and Charleston, and that too on a line that would give us a monopoly of the traffic.

The whole line should be under one single management, from Cincinnati to Charleston, without break of gauge or change of cars. This consolidation could readily be accomplished. It requires but a small amount of nerve, and but little management to do it. Can it be done in the interest of Cincinnati? It could, and should be, but will not be.

Those who could put in the money—the one thing lacking—won't—and those who would, can't.

We have no man in our midst with railroad experience, who can command the capital from private sources, and public subscriptions in aid of any enterprise is not consonant with the Constitution of the State. Between this *upper* and *nether* millstone the railroad enterprise of our city has been and will be crushed out, until the new fields and markets for our manufactures and products are preoccupied, and we are forced to take a second class chance and be brought into square competition with every other producing market of the country, with the disadvantage of railroad freights constantly pitted against us, by roads that run *from* us, instead of *to* and *for* us.

It is useless, we think, for Gen. Harrison to come here, with the expectation of getting any assistance—material—for the construction of the Blue Ridge Railroad. "Silver and gold, have we none"—(that he can get at;) but if he comes and wants any *resolutions* we will pledge him the "Chamber of Commerce" and the "Board of Trade," and if he deems it necessary a series framed by the combined wisdom of both boards of our City Council,—we will give him an opportunity to make a speech, and perhaps some of our Solons will consent to speak back at him, he shall be toted through our streets to see the magnificent structures erected since the war from the profits of shoddy and whisky, and then from Clifton heights and the towers of Mrs. Bowler

and Mr. Prohasco's residences, he shall see the glories of our suburbs, and he dined and wine and sent home with the best of wishes for his success. This is all that we *can*, or rather *will* do; but he must look elsewhere for that aid that he so much needs, and which our true interests dictate we should not hesitate to furnish.

Personal.

James Charlton, the gentlemanly and efficient General Ticket Agent of the North Missouri Railroad, we are informed has resigned his position with that road, to fill the vacancy occasioned by the resignation of A. Newman, the General Ticket Agent of the Chicago, Alton & St. Louis Railroad.

Our old friend, Chas. E. Follett, Esq., the General Ticket Agent of the Ohio & Mississippi Railroad, has resigned the position which he has so ably filled for many years on that road, to become the General Ticket Agent of the St. Louis, Vandalia & Terre Haute Railroad, taking the place of Frank Chandler, resigned.

We understand that Mr. A. Newman, the efficient General Ticket Agent of the Chicago, Alton & St. Louis Railroad, has resigned, to take effect July 1, 1871.

We are informed that John W. Conlogue, Esq., the very able Superintendent of the St. Louis, Vandalia, Terre Haute & Indianapolis Railway, has resigned.

A FACT FOR TRAVELERS—G. L. C., the New York correspondent of the Toledo *Commercial*, writes of the Erie Railway in a recent letter, thus:

Trains run regularly on time, full of passengers, and the new coaches recently put upon the road are marvels of elegance and comfort. The Erie was never in such splendid working order as it is to-day—and people are beginning to appreciate its comforts, notwithstanding the efforts of its rivals to mangle the litigation in which its managers are engaged with the actual business and operation of the road itself.

OREGON & CALIFORNIA RAILROAD.—This road extends from the city of Portland, Oregon, to the California State Line, following for about 150 miles the Willamette river. The Willamette valley is from 20 to 60 miles wide, very fertile and well settled. The road is finished to the city of Albany, 80 miles, with 20 miles more graded and bridged ready for the iron. The capital of the State—Salem—50 miles from Portland, is located on this line.

The patent of the invention of the late Henry Burden, of Troy, N. Y., for a horse shoe machine, dated June 30th, 1857, has been extended by the Commissioner of Patents, on proof submitted in the case. It is computed that the invention has saved to the public \$32,800,000 during the past 14 years. The examiner's report admits a saving of \$18,000,000. The extension is for seven years, from June 30th.

Blue Ridge Railroad.

OFFICE OF THE PRESIDENT,
COLUMBIA, S. C., June 28, 1871.

Hon. T. WRIGHTSON,

Editor Railroad Record:

After many vexatious delays, occasioned mainly by the peculiar condition of the finances of this State, and the distrust of capitalists to invest in Southern securities, the Blue Ridge Railroad Company in South Carolina is again in a condition I hope, to press the construction along the line more vigorously. A new company, composed of capitalists in South Carolina and New York, is now forming, who propose to complete the road in a short time on certain conditions. This proposition includes the issue of a preferred stock for \$2,000,000, bearing 7, 8 or 10 per cent. until road is completed, after completion to have same preference over stock now issued. The new company to hold or retire old stock. The company in this State and in New York propose to subscribe at once for one-half of this preferred stock. With the \$2,000,000 of preferred stock, and the \$4,000,000 mortgage bonds indorsed by the State of South Carolina, this road can be completed in two years from this date.

The advantages of this direct connection between Cincinnati and the nearest Atlantic port have been demonstrated for the last thirty years, and are being strengthened and fortified by the experience of each succeeding year. The excess of freights paid on your produce and manufactured articles by the consumer in the Southern States, by the way of Baltimore or New Orleans, would pay for the construction of this road every three or five years, to say nothing of the profits made through a direct trade with the South, West India islands and South America.

The connection by way of the Blue Ridge Railroad is deemed so important by the people of Georgia, that no less than four roads have been recently chartered with liberal State aid, viz., \$15,000 per mile: the Augusta & Hartwell Railroad to Clayton; the Athens & Clayton; the Cartersville & Clayton, and the Macon & Clayton or Knoxville Railroad Company. So that you will perceive that when once in connection with Knoxville you will have the most direct and cheapest communication with North Carolina, South Carolina, and almost all of Georgia.

With great deference, I would suggest that the true policy to be pursued by Cincinnati, in endeavoring to establish close railroad communication with the South is so clear as to render argument or demonstration almost unnecessary. It is, in a word, to make use of the road already constructed from Cincinnati to Paris, and thence to build a road via London, to connect with the Knoxville & Kentucky Railroad at the State line—a distance to build of 150 miles, at a cost of say \$5,000,-

000; or, following the road already built a little further, to Nicholasville, complete the connection to the Kentucky & Knoxville Railroad, by constructing 140 miles of road at about the same cost.

It would seem that when returning reason calls the people of Cincinnati from following the *IGNIS FATUUS* of the direct road to Chattanooga, a scheme which looks to others as if it had been devised mainly for the purpose of finding a place to spend ten millions of dollars, to accomplish an object that could be gained more quickly and easily by the expenditure of half that sum, they will turn their attention again to their first project, viz., a connection with the Southern section via Knoxville, which offers all they need at so small a comparative cost.

But pardon this digression. What we now propose is to appeal to the citizens of Cincinnati, either as a corporation or as individuals, to come to our aid, and subscribe at least one million of dollars of this preferred stock. The State of South Carolina, city of Charleston, and individual stockholders, have already paid in and expended on this road nearly three million of dollars. We purpose now to retire this old stock and permit new parties to come in with \$2,000,000 preferred stock, and by the use of \$4,000,000 mortgage bonds guaranteed by the State of South Carolina, build the road, and own it after it is completed. Surely the people of South Carolina are in this giving a sufficient guaranty of their great desire for this western connection. And if after more than 30 years' advocacy of this road on the part of your people, they should decline now to aid to this small extent, we may well doubt their sincerity, or the importance of the connection to them.

I have addressed you on this subject, because I know your great desire, and have read your constant appeals for this great enterprise. Please place it again before your people, and if likely to be successful, the Blue Ridge Railroad Company will aid in any manner which may be suggested.

I have for the last four years devoted my time to fostering and encouraging this enterprise, and now feel that the road may be secured beyond a doubt, with a small amount of aid from your city. But if we should fail in the end, the people of South Carolina will always remember with gratitude the unceasing efforts you have made in a common cause with them. Yours very truly,

J. W. HARRISON,
Pres. B. R. R. Co.

A NEW NIAGARA BRIDGE AT BUFFALO.—The acts of Congress and of the Dominion Parliament have authorized the construction of a new bridge across the Niagara at Buffalo. The act authorizing its construction makes it a post route. The work will be under the superintendence of the directors of the Grand Trunk Railroad.

Gen. Burnside on 'Change.

THE VINCENNES & CAIRO RAILROAD.

Just before the adjournment of the chamber of commerce, Saturday, General Burnside addressed the body in the interest of the Vincennes & Cairo Railroad. The general was introduced by President Rowland, and said:

MY FRIENDS OF THE CHAMBER OF COMMERCE—I am glad to meet you under different circumstances from those under which I last met you. Then our minds were all resting on the probabilities of war; in fact, upon the possibilities of maintaining the integrity of our government. Now, happily, we are free from all those annoyances, and I come here to talk with you upon the pursuits of peace. I have been at work upon a railroad from Vincennes and Cairo for some three or four years, and circumstances over which I had no control stopped the work. It is now upon the eve of being recommenced. It has been suggested to me that some of the donations which were given the road, which have lapsed in consequence of the loss of time in building it, and which can not be reinstated under the new constitution made by the State of Illinois—it has been suggested to me that the business men interested in that section of the country would give their best efforts to reinstating their donations, with the view of allowing the work to go on. Cincinnati is largely interested in a railroad from Vincennes to Cairo. It is useless for me to talk to the merchants and business men of this city upon this point. They realize it as well as I do. I do not come here with a view of urging you to the pursuit of any course not directly for your interest; I come merely to see whether you can not do something toward reinstating the original donations given for the road, and thereby allowing the work to progress. You all know as well as I do that capitalists will not invest their money in building new roads through sparsely settled countries, with the distinct knowledge that a long time must elapse before they will receive any revenue from their money, unless they can have some encouragement from people along the line of the road. It is very easy to build a road through countries where public lands are passed over, because the government grants large subsidies to those roads. In the southern part of Illinois all the government land is taken up, and nothing can be obtained in aid of the construction of roads, except from people along their lines, and individuals in commercial centers interested in trade along the roads. The desire is that the merchants of Cincinnati interested in the trade of southern Illinois should subscribe or donate to this road a sufficient amount to make good their lapsed subscriptions. The merchants of Cincinnati originally subscribed some \$50,000; it is now desirable that they should make up from \$150,000 to \$200,000.

If the business men of the city make this donation, I can only say that I believe it will be for their interest, and assure them that the road will be built; and built as a connection road with the Ohio & Mississippi road, which leads into this city. I have no disposition to urge business gentlemen to do what they think is not wise and proper for them to do; I merely state these facts in a plain, homely way. My opinion really is that the reinstatement of their old donation, with such additions as they may think proper, would be to their interest, as well as to our own.

In conclusion, the general invited inquiry

from those present as to the plans and prospects of the proposed road, and no curiosity being manifested, he took his seat.

Mr. John A. Gano then moved that a committee of three be appointed to confer with General Burnside and General Baum, who is also here in the same interest, as to the means to be employed to renew the original donations to the road. The motion was carried, and President Rowland said he would announce the committee on Monday.

The road of Gen. Burnside is one of very great importance to the city of Cincinnati, and should meet with a careful and candid consideration of its merits.

In this connection, however, it would be well to look at some suggestions offered by a correspondent of the *Commercial*, which are worthy of being carefully noted. Whether there are any engineering obstacles in the way of either project, we are not at present prepared to say. But this we will say, that the latter would be much more of a Cincinnati line than the one contemplated by Gen. Burnside, to Vincennes, and we think less liable to be gobbled up by other interests.

The correspondent says:

I desire in this article to call the attention of your business men and capitalists to some railroad movements in South-west Indiana, and Southern and South-eastern Illinois. There was a time when from both these fields your business reaped a profitable harvest, and both may be made again tributary to Cincinnati commerce. A railroad has recently been built from Shawneetown, in the South-east corner of Illinois, on the Ohio river, to Edgewood, on the Illinois Central, thirty-five miles north of the Ohio and Mississippi Railroad, which it crosses at Flora. Another railroad, known as the St. Louis and South-eastern Railroad, now nearly completed from St. Louis to Evansville, with a branch leaving the main line at McLeansboro and going to Shawneetown. Among the other proposed roads is one from Grayville to Mattoon; another, from Vincennes to Mattoon. Those roads that are now built and those proposed in Southern Illinois are interested in carrying commerce from your city. Now, we of Posey and adjoining counties, propose a railroad from Mt. Vernon to an intersection with the Rockport and Cincinnati Railroad. The action of your citizens in making this enterprise a success, has determined us on this. One line will pass through the counties of Posey, Gibson, Pike and Dubois—intersecting the Rockport and Cincinnati Railroad, either at Jasper or near there.

Those counties can and will raise their proportionate share of the required sum to build the road. Your readers are no doubt informed of a railroad organization known as the Indianapolis, Vincennes and Cairo Railroad. After various struggles and reverses it was completed from Indianapolis to Vincennes, and fell into the hands of the Pennsylvania Central.

At the time this movement was commenced there was no railroad in Illinois south of the Ohio and Mississippi road, except the Southern end of the Illinois Central from Sandoval. But during the struggle for life of the Indianapolis and Cairo Railroad, the Shawneetown and Edgewood, and St. Louis and South-eastern, with its McLeansboro branch and its proposed branch to Paducah, all came into existence, and have occupied, to a considera-

ble extent, the territory proposed to be controlled by the Vincennes and Cairo Railroad. The line of the Vincennes and Cairo Railroad follows the general direction of the Wabash river, depending for business for about ninety miles on the same country that does the Shawneetown and Edgewood road, as well as the Wabash river. At a point on this proposed Vincennes and Cairo road, known as Powell's, it is less than twenty-five miles from this place. Now would it not be a good railroad proposition—a good Cincinnati railroad proposition—to bring this road east twenty or twenty-five miles and unite it with the Cincinnati and South-western Railway at this place, and thus make it certainly a Cincinnati route. Would this not be better for the Cairo road than for it to run due north, or nearly so, for seventy-five or eighty miles to Vincennes, especially since one of the counties decline to aid the enterprise? While this would, in our judgment, be the best for the Vincennes and Cairo road, I suggest: Is it not the only way Cincinnati can control the trade and commerce of Southern Illinois?

You may think we are anxious for the prosperity of our own town and county. So we are; and we will do our share—more than any county from Indianapolis to Cairo has done. But while the programme suggested will benefit us, we appeal to the unanswerable logic of facts whether your interest does not lie in the same direction.

NORTH CAROLINA RAILROAD.—In the case of Anthony H. Swazey vs. The North Carolina Railroad Company, and David A. Jenkins, Public Treasurer of North Carolina, Judge Bond, of the Circuit Court of the United States, Fourth Circuit, and District of North Carolina, has made a decision that the act of 1849 creates a lien upon the stock in favor of bondholders, and upon dividends declared, or to be declared, upon the stock; and that no subsequent legislation of the State could constitutionally impair this lien.

That the North Carolina Railroad Company, its officers and directors, be restrained by the injunction from paying to the defendant, David A. Jenkins, or to any person or persons, who may, on behalf of the State of North Carolina, demand the same, any and all moneys accrued or to accrue as dividends upon the stock held by the State of North Carolina in the said North Carolina Railroad Company, and that S. F. Phillips, of the city of Raleigh, be appointed receiver, to take and receive into his possession all moneys now or hereafter to be paid by the North Carolina Railroad Company as dividends upon the said stock, and especially moneys heretofore ordered by the said Company to be paid on and after March 1, 1871, as a dividend upon the said stock.

The bonds referred to were issued by the State of North Carolina to aid in the construction of said road. Samuel Phillips was appointed receiver on giving bonds for \$200,000.

THE PACIFIC RAILROAD CLAIMS.—Washington, June 23—Attorney-General Akerman has rendered an opinion to Secretary Delano in the case of the Atchison branch of the Pacific Railroad, adverse to the claims of that company to lands and to bonds for the extension of that road beyond 100 miles from Atchison. This is the road known as the Pomeroy Branch Union Pacific. The lands and bonds asked for amount to from \$5,000,000 to \$7,000,000.

Virginia & Tennessee Railroad Company.

The revenue and expenditures for the two years ending September 30, 1869 and 1870, compare as follows:

Revenue from—	1869.	1870.
Passenger traffic.....	\$309,386 16	\$335,710 23
Mail service.....	20,500 0	20,500 00
Express service.....	24,333 56	24,719 20
Tonnage traffic.....	566,600 77	679,336 85
Miscellaneous sources.....	4,104 36	3,408 01
Gross earnings.....	\$929,184 85	\$1,063,822 29
Operating exp. taxes, etc.....	610,496 88	636,785 59
Net revenue.....	\$318,687 97	\$427,036 70
Gross revenue per mile.....	4,311 99	4,971 13
Operating exp. per mile.....	2,552 79	2,975 63
Net revenue per mile.....	1,489 20	1,995 50

The increase in 1869-70 over the previous year was: gross revenue, \$134,637 44, or 14 5 per cent.; operating expenses, \$26,288 71, or 4 3 per cent., and net revenue \$108,348 73, or 34 1 per cent.

These results surpass those of any previous year, and evidence the solidity of the foundation of which the business of this road is based, and the wise policy under which it has been conducted.

The expenses of the road department afford the most gratifying evidence of the value of the improvements made. For the year 1869-70 these have been \$117,859 58 as against \$139,922 80 for the previous year, showing a decrease in the very respectable sum of \$22,063 22, or 15.8 per cent., and when considered with reference to the units of measure, stand for the year now passed at \$554 74 per mile of road, 22.77 cents per mile run by revenue trains, and 20 11 cents per mile run by all trains as against the corresponding results of the previous year, which were \$653 85 per mile of road; 29 68 cents per mile run by revenue trains, and 25 42 cents per mile run by all trains; a deduction in favor of the past year's operations of 23 per cent. for revenue trains, and 21.5 per cent. for all trains.

The rolling stock owned by the company at the close of 1869-70 consisted of 42 locomotive engines, and cars—18 passenger, 4 mail and baggage, 105 box freight, 73 stock, 89 platform and 20 cahoose—total, 309 cars, being an increase during the year of 36 cars; 86 have been retired and 120 placed in service.

The following statement compares the funded debt at close of the last two years:

	1868-69.	1869-70.
1st mortgage bonds.....	\$4,400,000 00	\$494,000 00
2d mortgage bonds.....	6,000 00	4,000 00
3d or enlarged mortgage bonds.....	99,000 00	99,000 00
Income mortgage bonds.....	119,000 00	113,000 00
4th mortgage bonds.....	774,000 00	846,000 00
Registered certificates.....	112,449 76	116,199 11
Interest funding bonds.....		204,200 00
Interest past due and unpaid.....	3,9169 37	13,344 00

Total.....\$2,828,639 13 \$2,899,209 11

From a comparison of these statements it will be seen, that there has been an increase in this class of indebtedness of \$70,629 98, of which, however, \$35,659 60 is for interest which had accumulated on the past due coupons, heretofore reported as outstanding, mainly at the outset of the present administration, and then unfunded, of which no account has been taken, because of the impossibility of estimating at that date the amount thus due.

The floating debt is given gross at \$688,891 22, of which \$506,201 34 is by notes and acceptances and \$182,689 94 by open accounts.

The resources of the company as an offset to this class of debt consists of \$154,000

eight per cent. bonds rated at \$80, \$123,200; open accounts, \$243,747 01; storehouse supplies, \$57,457 73, and cash, \$12,343 77—total, \$436,848 54.

The net floating debt is therefore \$252,042 74.

NORFOLK & PETERSBURG RAILROAD COMPANY.—The revenues and expenses of the Norfolk & Petersburg Railroad for the fiscal years ending September 30, 1869 and 1870, are compared in the following statement:

Revenue from—	1869.	1870.
Passenger traffic.....	\$52,506 07	\$61,966 16
Freight traffic.....	251,696 85	286,910 61
Other sources.....	324 45	216 82

Gross revenue.....\$304,527 37 \$349,083 59
Expenses, taxes, etc. 183,357 02 200,166 21

Net revenue.....\$121,170 34 \$148,917 38

The increase in gross revenue in 1870 over that of 1869 is, \$44,556 22, or 14 6 per cent.; and the expenses \$16,809 19, or 9 per cent. The net revenue has increased \$27,747 03, or 23 per cent. In 1861 the gross revenue of the road was only \$96,621 74.

At the close of 1870 the company had 10 locomotives, being an increase of one, and 194 cars, being an increase of thirty during the year. The car equipment is now as follows (all four wheeled): passenger cars, 10; mail and baggage, 2; box freight, 114; stock, 2; platform, 64; and timber trucks, 2.

SOUTH SIDE RAILROAD COMPANY.—The revenues and expenditures resulting from operating the road in the years ending September 30, 1869 and 1870, compare as follows:

Revenues from—	1869.	1870.
Passenger traffic.....	\$82,692 49	\$99,643 24
Freight traffic.....	345,791 42	395,783 30
Mail service.....	6,649 92	6,649 92
Express service.....	2,394 28	4,619 03
Other sources.....	3,790 85	6,181 14

Gross earnings.....\$440,920 96 \$512,876 63
Operating expenses. 337,795 58 332,724 70

Net revenue.....\$103,125 38 \$180,151 93

The increase in gross revenue was \$71,955 67, or 16 3 per cent.; in expenses, \$5,070 88, or 1 5 per cent., and in net income, \$77,026 55, or 74 7 per cent.

This large increase in gross revenue and decrease in current expenses has resulted in a net revenue sufficient to meet every demand for interest on the funded debt, and in a surplus of \$71,853 80 as against \$23,555 38 for that of the preceding year.

The present stock of cars on the road consists of 5 passenger, 5 mail and baggage, 142 box freight, 72 flat, and 15 cattle—total, 237. The motive power consists of 17 engines, viz: 3 passenger, 7 tonnage, 5 material and 2 switching.

THE DELAWARE BRIDGE.—The obstacles which have stood in the path of this important enterprise have at last disappeared, and there is every prospect that before the year has expired the work upon it will be energetically in progress. The original plan of a draw which met with some objections on the part of the Examining board, has been finally abandoned, and the plan of an elevated bridge, offered by Thomas S. Speakman, chief engineer, has met with approval.

Suburban Railways—Their Construction and Operation.

At the time when the various lines of railroad leading from New York into the interior were built, the principal object was to accommodate a mixed traffic of freight and passengers, carried over long distances; and the consolidation of lines stretching far westward, with the profit resulting from it, has made the short traffic of comparatively less importance as a source of income, under the present method of managing it. As the short traffic has gradually increased so as to require special trains, these have been merely duplicates of those used for long travel.

In reviewing the methods proposed, as adapted to the requirements of this short traffic, prominence has lately been given to roads of narrow gauge, on account of their financial success in Wales, and also in some parts of the Continent of Europe. It is claimed that these roads are cheaper to build as well as more economical to operate.

The principal saving in cost of building such roads is made up as follows: In the quantities of land required, and of excavation and embankment; in the use of shorter ties; and also the saving in cost of equipment; as such roads require light engines and cars. The saving in construction may be about as follows: When a road has light cuts and fills of not more than 15,000 cubic yards to the mile, there will be about one-sixth less earth to be moved. But this saving will be rapidly lessened when the cuttings are deeper than 6 feet, the saving being only made in the road bed, which is only a small part of the excavation in deeper cuttings. In these the slopes furnish most of the material. These require the same amount of earth to be removed for a narrow bed as for a wide one, so that with any work, except that under 6 feet depth of cutting or height of embankment, the saving will be inconsiderable. The ties will be shorter by the difference between a 3 foot and a 4 foot 8½ inch gauge, which is the difference between the width of the two systems, the present one and that under consideration.

The above are the principal items in which any saving can be made, for cheap and light cars can be used on either gauge; but those on the present gauge will give more accommodation to passengers. With these slight advantages, there is the serious drawback, that such roads, if they enter upon those now built, will require a third rail to be laid for their use. This objection will have force upon any lines to be laid near the large cities, though there may be exceptional cases where it does not apply. There being no advantages in the 3 foot gauge sufficient to recommend it in preference to that used at present, the various modes proposed for the accommodation of the short traffic on the present lines will now be considered. That one now adopted to a limited extent, using a car with engine in one end, is adapted to carry about 80 passengers, but is not suited to carry more, and to stop and start, so often as is required; nor can they be reversed at the ends of the route without a turn table, should it be desired to run the engine always ahead of the passengers. They were not considered suitable for the London Metropolitan line, which is the one that seems to have studied the adaptation of the cars suited to its traffic with care, because they did not supply sufficient power to get up speed as rapidly as required with frequent stops.

As nothing suited to the purpose of con-

ducting the short traffic seems to be in use at present, it may be seen what is required, by an examination of the elements of cost of the present trains in detail. A train to carry 100 passengers consists of the engine and tender of 25 tons, a baggage car and two long cars, amounting in all to 77 tons, including the weight of 100 passengers, or to 1,550 lbs. for each person carried. The long cars have more than 600 lbs. weight for each person carried.

The attendants, with their wages by the day, are an engineer at \$3 48, a fireman at \$2 25, a conductor at \$3 88, a baggage-man at \$2 24, and three brakemen at \$5, or a total expense by the day of \$17.07. Besides this, the cost by the mile run, is as follows: Fuel, \$0.079, oil and grease, \$0.013, engine repairs, \$0.13, car repairs, \$0.10, being a total expense by the mile of 33½ cents. It will be seen by the above, that the dead weight hauled per passenger is very great, and this requires an unnecessary outlay for attendance, and also for hauling. If the dead weight per passenger can be reduced, a proportionate saving of labor and fuel and oil, can also be made.

With these ends in view, the following plan is now suggested, for local traffic of passengers residing not more than 20 miles from the city, a distance about equivalent to one hour's ride in the horse cars up town.

The cars proposed are to be a compromise between the horse and the rail cars. They are to carry the passengers, seated as now in the long cars, on seats for two at the side of the car, with a middle passage and end doors. With seats 2½ ft. apart, a car will carry 40 passengers, if made 25 ft. long. These cars are to be set on axles with as wide a base as the curvature of the road will permit, with but little overhang at the ends; and should be fastened together by spring couplers so as to have the train move as one mass. In other respects, they would be modeled like the horse cars. These weigh about 2 tons, and carry safely more than twice the number they can seat. By allowing a ton additional for the framing and bracing of the proposed car, it would then weigh 3 tons, for 40 persons. Assuming now that 200 persons are to be carried, 5 cars and their load will weigh 30 tons. The engine for such a weight may be lighted, and not exceed 10 tons. It should be made to run either end foremost so as to make no delay at the end of the route, by going on a turn-table, but merely switch off, and back to its place at the head of the train, in the direction of the next run. Requiring but little fuel and water for its light load, the tank can be put on the engine frame near the ground. A train made up in this manner will have great stability, the water and passengers being about 2 ft. nearer the ground than at present.

The total weight will be 40 tons, with power and adhesion sufficient to stop and start quickly, and it will move steadily, since the cars are bound tightly together, and they also have a low center of gravity. With the same expenses per ton moved as those of the train mentioned above, and assuming that 10 trips can be made in 16 hours, the cost of a 20 mile run will be \$1.15 for attendance, and \$3.32 for fuel, oil and repairs, or a total of \$4.47 per trip, with a capacity to carry 125 passengers through the whole length of the trip. Starting from the city with 200 persons, and leaving part of the load at every station, will give that number as the average through 20 miles. The actual cost of carrying 1 passenger 20 miles will be 3-410 cents for train

expenses. This is rather less than the rate at which it is stated that cheap passenger trains are now run 10 miles out of London, which is given as 25 cents per week, or 1½ cents for 20 miles.

Should a part of this saving over present rates be attained, the accessibility, and also with this the value of city suburbs, would be so much increased, to the mutual interest of land-owners and railroad, that even suggestions of what may be done will not be out of place, as calling attention to the subject.—*T. McDonough in Van Nostrand's Magazine.*

Resources of the North-west.

Says the *American Exchange and Review*: Puget sound, on the borders of which will be the future metropolis of the north Pacific coast, is an inland sea, dotted with islands, and joined to the Pacific by a gateway called the Strait of Fuca, 80 miles in length, 10 to 12 in width, and from 20 to 100 fathoms deep in all its parts. One arm of the sound extends northward from where it joins the strait, and the others southward; both divide and ramify, until the sound, with all its bays and deep water inlets, presents a shore line of 1,833 miles, and extends across two degrees of latitude. There is no obstruction at the entrance. The mouth of the strait is easily entered in all weather. For 150 miles the mid channel is 300 feet deep, and remarkably free from all hidden dangers. On each side of the main channel, and in the various bays which will be the real harbors and shipping ports, the water is still deep, but not too deep for anchorage. The holding ground is excellent. The waters abound with fish of great variety and excellence. The cod banks of Alaska are now known to be as extensive and productive as those of our Atlantic coast. These fisheries are necessarily tributary to the trade of Puget sound. Besides, the climate of Washington territory offers for curing fish just the required medium of temperature—an average of 40 degrees in winter and 62 degrees in summer. The fisheries are 800 miles nearer the drying racks and the shipping ports of Puget sound than to those of San Francisco. These advantages will govern the location of the fishing trade. The best whaling ground left to American harpooners is within eighteen days of the western terminus of the Northern Pacific Railroad. The basin containing the sound and its branches is bounded on the east by the Cascade range of mountains, and sheltered on the west by the Olympian or Coast range. This depression between the two mountain ridges is about 75 miles in width, and that part which is not occupied by the waters of the sound is mainly covered with magnificent forests, which extend to the very summit of the mountains. Here grows that Puget sound timber of which so much has been written—fir, cedar, pine, spruce, hemlock, oak, maple, cottonwood, ash, dogwood, alder, and some of the smaller varieties. The forest of giant fir and cedar are traversed by ten rivers, which flow down from the Cascade mountains and empty into the sound, furnishing ten alluvial valleys of agricultural land, and supplying for logging purposes another thousand miles of inland shore line. In connection with the remarkable climate (in which twenty varieties of flowers are known to be in bloom at the beginning of January), the productive capacity of the soil of the Puget sound region is great, both as to quantity and quality. Puget sound is no exception to the wheat yield of the Pacific slope. All the other cere-

a's are grown to perfection; oats are particularly plump and heavy. The small grains are at home in Washington territory. Pork is usually fattened upon peas, wheat and barley, and it is claimed can be made as cheaply as upon corn in the western States. Fruits of all kinds, except the peach and the grape, are raised in great profusion. Oregon and Washington apples are exported to San Francisco. Potatoes and other vegetables grown on the north coast, are also in high favor in San Francisco market. The turnip yield will be most abundant.

Cincinnati & Chattanooga Road.

AN APPEAL TO THE PEOPLE OF KENTUCKY.

In a speech at Meridian, Mississippi, on the 7th of this month, W. J. Sykes, Esq., of Memphis, said that he had been warmly in favor of the lease of the North & South Railroad to the Louisville & Nashville Railroad Company, as the best if not the only means of securing the early completion of that great work, so much needed by the whole country. He had advocated this policy in a speech at Elyton, Alabama, in March last, and he was rejoiced to know that it had been effected. He was not terrified by the clamor about a Louisville monopoly, for he felt assured there were other means of preventing this if it should be attempted. As Louisville had now obtained virtual control of all the roads from Louisville to Pensacola, she should no longer oppose the Cincinnati Southern road.

Kentucky should, by all means, yield to the wishes of her sister States of Mississippi, Alabama, Georgia and South Carolina, and permit this road to be built, under such restrictions and guards as would protect her own citizens. Certainly it was no more an infringement of State rights, of which Mr. Sykes had always been an advocate, to permit a city or corporation in another State to build a railroad through Kentucky or Tennessee, under proper restrictions, than it was for a railroad corporation in another State to buy, lease or control a railroad in Alabama and Tennessee. Neither was, according to his notions, a violation of State's rights. Tennessee granted the right to Georgia to build a railroad into Tennessee, and upon her "sacred soil," as far back as 1850, and, in doing so, did not feel that she had given up any of her rights. State rights were intended for the protection of the people, and not as a barrier to progress and improvement. If Kentucky would build this Cincinnati Southern Railroad herself, it would be better than for Cincinnati to build it; but if Kentucky is either unable or unwilling to do so, certainly there can be no reasonable objection to permitting Cincinnati to spend ten millions of dollars in constructing a railroad through Kentucky and Tennessee, which is to form a great outlet to the Southern States, and which will add so much to the wealth of the people of Kentucky, and to the revenues of the State.

It is to be hoped that Kentucky will herself grant the right of way to this road to be built by Cincinnati, upon terms satisfactory to all parties, in order that no pretext may be afforded for congressional interference. The people of Mississippi, Alabama, Georgia and South Carolina ask this from Kentucky, not for the sake of Cincinnati, but for the advancement of their own interests. While they might prefer Louisville to Cincinnati, yet they wish the privilege of trading with either as may best suit them. They make an appeal to the generosity, magnanimity and

sense of justice of the people of Kentucky to permit this road to be built, which appeal, they can not believe will be made in vain.—*Chattanooga Times.*

Memphis & Little Rock Railroad.

SUPR'S OFFICE, M. & L. R. R. R.

Memphis, Tenn., Feb. 15, 1871.

R. C. BRINKLEY, Esq., President:

Sir—I have the honor to submit the following report of the operations of the road in this department, for the year 1870.

The receipts from both divisions of your road have been as follows:

From passengers	\$100,733 19
From freight.....	61,179 09
From other sources.....	7 913 47

Total cash receipts.....	\$169,825 75
For mail service credited on purchase of property from the U S	10,651 76

Total\$180,477 51

The expenditures have been:

Conduct'g transport'n.	\$75,768 19
Motive power.....	52,130 10
Maintenance of way...	81,731 18
Maintenance of cars...	14,578 08
	204,207 55

Excess of expenses over receipts \$23,730 04

By an examination of the table hereto attached you will find that the losses occurred in the first five months of the year, and while the road was only partially operated. The receipts for the months of January, February, March, April and May, on the Eastern Division, only amounted to \$9,537 58; expenditures for same time, \$39,224 35. Expenditures over receipts, \$29,686 77. Of this amount there was an expenditure of over \$20,000 for maintenance of way alone.

LAND DEPARTMENT.

This department has also been under my management. During the last year an increased demand has taken place for lands, and more lands have been sold during the last year than during all the preceding years since the war, and at better prices.

The sales of lands have amounted to 4,506.46 acres, at an average per acre of \$4 52; making total sales for the year, \$19,299 80; town lots sold at Brinkley, \$5,665; total lands and lots sold, \$24,964 80. Fully one-half has been received in cash and the remainder on one and two years' time, with eight per cent. interest.

BLUE RIDGE RAILROAD.—We had the pleasure of meeting with Gen. J. W. Harrison yesterday, and we rejoice to know that he is in good spirits in respect to the early completion of the Blue Ridge Railroad. Notwithstanding the great anxiety of the people of this section to be informed of the exact condition and prospects of this great enterprise, yet we are satisfied that it would not be prudent prematurely to disclose the present programme for its successful construction. Suffice it to say, that new friends and capitalists have come to the aid of the company, among whom it is more than gratifying to learn that Charleston is ably and most energetically represented. The patient and untiring devotion of the president seems at last about to be rewarded, and the consummation of present expectations will be the best guarantee of faithful services in behalf of the interests committed to his charge.—*Andersonville Intelligencer.*

Grain Transportation on the Upper Mississippi.

Very few have any idea of the vast amount of grain carried, chiefly from Minnesota landings, on the Mississippi river, on its way to Chicago and Milwaukee. Several lines of steamboats and barges find their chief business at this time of year in carrying grain and flour from these landings to the railroads. Indeed, the largest part of the product of Minnesota has heretofore been carried on the Mississippi to La Crosse, Prairie du Chien, Dubuque and Fulton, there to be transferred to the Chicago & North-western, the Milwaukee & St. Paul, or the Illinois Central, for transportation to Lake Michigan.

The Milwaukee & St. Paul alone has had a through line by rail to the lake, but the completion of the North-western's line between Winona and La Crosse has made a rail outlet to one more railroad hitherto entirely dependent on the river, and the West Wisconsin and the Baraboo Air Line will soon bring the railroads still more closely into competition with the steamers.

But this year a new diversion has been made on the river itself through the Lake Superior & Mississippi Railroad, which seeks to carry the wheat and flour of Minnesota to Duluth for lake shipment. It has now a line of steamers and barges which run between Winona and Stillwater, to which little town on the St. Croix river the Duluth road has a branch; and as the rail transportation by this route is only 150 miles, in place of 400 or 500 to Lake Michigan, and the distance by lake from Duluth is about the same as from Chicago, it will readily be seen that it is able to make low rates; indeed, we are informed that there has been a reduction of the rate on flour from Winona to New York from \$1 50 to \$1, chiefly on account of the competition of the Duluth route.—*Railroad Gazette.*

MICHIGAN CENTRAL RAILROAD.—A survey has been made for a line to connect the Air Line with the Detroit & Hillsdale, and in connection with these and the Central for a new and shorter through line between Chicago and Detroit. A line has been run from Manchester, on the Detroit & Hillsdale, — miles west of Ypsilanti, west to Homer, which is on the Air Line, — miles west of Jackson. This line is 39 miles long. Why it should be constructed to Manchester is not easy to see, as it would then have to run along the Hillsdale road for 12 miles, reaching it first at Brooklyn. The line from Chicago to Detroit by this design would be as follows:

	Miles.
Michigan Central, Chicago to Niles.....	93
Air Line, Niles to Homer.....	80
New line, Homer to Brooklyn.....	27
Det., Hillsd. & Ind., Brooklyn to Ypsilanti	36
Michigan Central, Ypsilanti to Detroit...	30
Total.....	266

as against 284 miles by the main line of the Central, and 272 miles by the Central & Air Line via Jackson. All the lines are controlled by the Central, which, when all are open and in condition, will thus be able to save 18 miles on the present route to Detroit and the East, by which time, probably, the Canada Air Line will give it a line only 495 miles long to Buffalo, 917 miles long to New York by the Erie, and 935 miles by the Central.

THE NEW JERSEY RAILROAD LEASE.—Proceedings have been commenced in the Court of Chancery, at Trenton, to test the validity and constitutionality of the proposed lease by the united railroad companies of New Jersey to the Pennsylvania Railroad Company. On Saturday last a bill was filed in the clerk's office of the court by a large number of the stockholders of the united companies, among whom were John Black, Henry H. Longstreet, Samuel C. Forker, Thomas N. Adams, Thos. Robb, Caleb R. Smith, Samuel Rogers, Wm. R. Vandegrift, David Harmer, Jacob M. Douglas, of Burlington county; Henry D. Johnson and Robert C. Hutchinson, of the county of Mercer; Ira C. Voorhees and Louis Stout, of Middlesex; and Charles Bartels, Jediah Higgins, John V. Capner, Avery Parker and others, of the county of Hunterdon, asking the Chancellor to restrain by injunction the officers and directors of the united companies from executing said lease and transferring the property and franchises of the company to the Pennsylvania companies. The Chancellor, on the filing of the bill, granted a temporary injunction, with a rule to show cause the 25th of July why the same should not be made absolute.—*Am. Railroad Journal.*

GRAND RAPIDS & INDIANA RAILROAD.—Jesse L. Williams, receiver of the Grand Rapids & Indiana Railroad Company, has made his final report and account as such, and has been discharged from the duties thereof by an order of the Circuit Court of the United States for the Western District of Michigan. J. K. Edgerton, in his official announcement of the same, says the contract now in force between the Grand Rapids & Indiana Railroad Company and the Continental Improvement Company obligates the latter to complete and equip, at its own cost, the Grand Rapids & Indiana Railroad, with all its structures, material, furniture and appurtenances, including station grounds and right of way, suitable for a first-class railroad, from its terminus in Fort Wayne to Little Traverse bay, Mich., 330 miles, by June 3, 1874, in consideration of which the Continental Improvement Company has the right, during the period of construction, to operate the road, receiving its earnings, etc., but will pay all expenses for running the same. The road north of Paris, its present northern terminus, 200 miles from Fort Wayne, is being pushed forward rapidly.

—The St. Louis & Santa Fe Railroad is attracting considerable attention throughout Kansas and western Missouri. That portion of the line from Fort Scott to Humboldt is under contract, including the bridging of the Neosho at Humboldt. The *Eldorado, Butler County Times* says: "By an examination of the map, it will be seen that this will make an air-line railroad from St. Louis to Santa Fe. The counties in Missouri, on the line of this road, are working up several millions in bonds to aid in the immediate construction of this all important road. The most superficial observer will admit that the construction of the St. Louis air-line railroad to Fort Scott will necessitate its construction farther west. In view of this fact, and that the Fort Scott road will be completed to Humboldt this year, a lively interest is being taken by the people along the fifth parallel to secure the construction of this road to Wichita and farther west as soon as possible. Greenwood county has already voted \$200,000 in bonds to aid in the construction of an east and west road. Sedgwick county voted \$200,000 in bonds for the same proposition a year ago.

—The Union Depot Company whose organization was announced in a former issue, decided upon the following working arrangements: Pro-rating to be made on tonnage of freight passing through tunnel or going to depot, through tunnel or otherwise, and each passenger, baggage and express car entering depot or tunnel, to be assessed the same as ten tons of freight, and the roads to run all their passenger trains running beyond the present limits of St. Louis; and from the depot in St. Louis; no charge to contracting roads for locomotives or empty cars; privileges of depot to consist in the use of tracks in depot, sidings for empty trains, waiting, baggage and conductors' rooms, ticket and telegraph office; choice of tracks to be at the option of contracting lines, or determined by lot; passage of trains through the tunnel to be regulated as by Bridge Company; each contracting railway to use depot and tunnel; rates to be made by board of directors by two third vote—the contracting roads to subscribe at least \$50,000 each to capital stock, and represented by one member of the board. The total subscriptions to stock at the meeting amounted to \$1,500,000, as follows: O & M., \$100,000; T. W. & W., \$250,000; St. L., V. & T. R., \$100,000; Ind'ls & St. L., \$50,000; N. Mo., \$100,000; Ill. & St. L. Bridge Co., \$100,000; P. C. & St. L., \$250,000; Pennsylvania Co., \$200,000; Iron Mount, \$50,000; Chi & Alt., \$50,000; J. B. Eads, \$50,000; J. D. Smith, \$50,000; Andrew Carnegie, \$10,000; Thomas A. Scott, \$5,000; William Taussig, \$10,000; J. H. Britton, \$5,000; A. N. Crystie, \$105,000; D. Torrance, \$5,000; L. B. Parsons, \$100,000. Total, \$1,500,000.—*Jour. Com.*

CHICAGO & NORTH-WESTERN RAILROAD.—The iron on the Baraboo Air Line had last week been laid eight miles beyond Madison, to within twelve miles of Lodi. The iron is being laid at the rate of half a mile a day. Work has been commenced on the bridge over the Merrimack river, and grading has been begun west of Baraboo. Mr. George L. Dunlap, who has been connected with this company from the beginning, and has had charge of its operation as general superintendent or general manager for thirteen years, has resigned his position as general manager, and is succeeded by Col. James H. Howe, who has been solicitor of the company since 1864.

ATLANTIC, MISSISSIPPI & OHIO RAILROAD COMPANY.—The Legislature of Virginia, by an act passed and approved June 17, 1870, authorized the consolidation of the Norfolk & Petersburg, the South Side, the Virginia & Tennessee, and the Virginia & Kentucky Railroad Companies into one corporation. Such consolidation was consummated November 12, 1870, and ratified by the several companies, which from that date took the title of the "Atlantic, Mississippi & Ohio Railroad Company;" and these railroads are now operated respectively as divisions of the A., M. & O. Railroad, all under the Presidency of Gen. Wm. Mahone, the distinguished railroad financier and manager of Virginia.

—The directors of the New York & Oswego Midland Railroad Company, at a meeting in Oswego on July 1st, let the unfinished portion of their road in Delaware and Sullivan counties, to be finished in one year. This completes the road from Oswego to New York.

AMERICAN STEEL.—According to the *Manufacturers' Review*, ten years ago, eighty seven per cent. of the steel for machinery and edge-tool purposes used in the United States was of foreign make. To day we are assured that the consumption of foreign steel is as one to eight. The United States produces ninety per cent. of all the steel consumed in machinery, edge-tools, and for agricultural purposes. The progress in American steel dates from 1859, since which date it has been demonstrated that a reliable article of tool steel can be had at home. The products of Pittsburgh steel works in the form of spring steel, homogeneous sheet, table and fine pocket cutlery, etc., are in general use. The product of these works exceeds nineteen thousand tons of steel per annum. The homogeneous cast steel boiler and fire box plates made in Pittsburgh are pronounced the best in the world. We are informed that the leading railroad companies and locomotive works throughout this country have ceased using the foreign article entirely, owing to the superiority of the Pittsburgh steel.

—A branch railroad, about four miles in length, to connect the Central Railroad of New Jersey with the Newark & New York Railroad, has just been commenced, to be completed in about five months. The road commences at Elizabeth, and runs in a straight line across the Salt Meadows. As there will be no heavy excavations to make, or gullies to span, it can be constructed at comparatively little expense. The track, when completed, will be the means, it is believed, of restoring all the meadow lands lying west of it, as it will be laid upon an embankment high enough to shut out the overflows from the river.

—The Tredegar Iron Works, at Richmond, Virginia, now turns out five tons of iron to one before the war, and last year manufactured 17,000 tons of wrought and cast iron, in addition to implements, bringing \$2,000,000 to the city of Richmond. They work from 800 to 1,000 hands, and have capacity for from 1,500 to 2,000.

THE BED OF THE OCEAN.—It has been definitely ascertained that the greatest depth of the ocean does not reach 3,000 fathoms in any part where telegraphic lines have been laid. The bed of the North Atlantic consists of two valleys, the eastern extending from 10 to 30 deg., the western from 30 to 50 deg., west longitude. The extreme depth of the eastern valley is under 13,000 feet, which is less than the altitude of Monte Rosa. This valley has been traced southward to the equator. It is separated from the western valley by a ridge in 30 deg. west longitude, in which the average depth is only 1,600 fathoms. This ridge terminates to the north in Iceland, and southward to the Azores, so that it is volcanic in its character at both extremities. Its extreme breadth appears to be under five hundred miles, and the Atlantic deepens from it on both sides. Explorations carried on in the Mediterranean, the Red Sea and the Indian Ocean, showed similar uniformity in the level of the sea bottom; and the general conclusions arrived at by Capt. Osborn were, that in the deep sea there is an absence of bare rock, and that there are no rough ridges, canons or abrupt chasms. Moreover, that the depth of the deep sea is not affected by currents or streams, even by those of such magnitude as those of the Gulf Stream; but it rather resembles the prairies or pampas of the American continent, and is everywhere covered with a sort of ooze or mud, the debris of the lower forms of organic life.—*Nature.*

SPONTANEOUS FIRES.—Fires have been found to occur in woods remote from the habitations of man in the Departments of des Landes and de la Gironde, in France. Instead of attributing them to incendiaries they are now supposed to arise in a natural manner. The resin of the trees exudes and forms itself into transparent spherical lenses, which act as burning glasses. It does not appear that any one has seen any such effect by the unassisted powers of nature, or that the suggestion is anything more than a bold venture of French imagination. It is indeed a possibility that all the conditions might concur, of a pelucid globule getting itself hardened exactly in the right position to bring a sharp focus upon a piece of wood sufficiently dry and rotted to be properly inflammable, and then upon the other side coaxing the sun to pour its rays through the instrument at exactly the right angle, at the very moment when assured of a nice fanning breeze; but the probabilities against its occurrence once in a cycle are sufficiently enormous to lead a careful mind to exhaust all other possibilities first, such as negligent travelers, or hussies, or gipsies, or even the friction of dry tree branches together, or strokes of lightning.

FRENCH COTTON.—The rich cotton manufacturers of Southern Alsace are in despair at the prospect of annexation to Germany. They will find themselves cut off from the rich markets of Paris, Lyons and Marseilles, distant only a few hours by rail, where they have established commercial relations of many years' standing; and forced to the new and remote markets of Northern Germany. Shut out by the Black Forest from any direct communication with Wurtemberg and Bavaria, they will have before them a thinly populated and mountainous district, untraversed by any railway, and behind them a customs frontier, dividing them from their old markets. Their only outlets will be South into Switzerland or North to Frankfurt, while the prospect of having no seaport nearer than Bremen or Hamburg fills them with dismay.

BAMBOO FIBRE.—This article has of late been imported to a considerable extent into this country, and will in time become a very important article of commerce. It is used as a substitute for Palmetto leaves, the fibre of which was used some time since for mixing with any material for the manufacture of textile fabrics, but which was abandoned on account of the difficulty of procuring a sufficient quantity to supply the demand for it. The Bamboo has been experimented with and found to answer the same purpose, and it is now imported from the West India islands in large quantities and the demand increasing rapidly. When the experiment was first tried, the bulk was a very great objection, as freights were too high to make its use profitable, but lately it has been brought here after having been crushed in a cane mill and then pressed into bales by a powerful press, which condenses its bulk and renders it easy of transportation at reasonable rates. After the raw material arrives here it is soaked in some one of the alkalies and by this process the wood is separated from the long silky fibre which is very soft, and which is made in India into a kind of coarse silk, but a considerable quantity is used to mix with Chinese and Indian silks and crapes.

It is said that iron ores containing phosphates can be purified by treatment, first with sulphuric acid and a subsequent washing with water. In some cases, instead of sulphuric acid some other oxygen combinations of sulphur are employed. Ores which contain sulphur and carbonates should be roasted before the treatment just referred to.

A RIVER IN THE OCEAN.—There is a river in the ocean. In the severest drouths it never fails, and in the mightiest floods it never overflows. Its banks and its bottoms are of cold water, while its current is warm. The Gulf of Mexico is its fountain, and its mouth is the Arctic Sea. It is the Gulf Stream. There is in the world no other so majestic flow of water. Its current is more rapid than the Mississippi or Amazon, and its volume more than a thousand times greater. Its waters as far out as the Carolina coasts are of an indigo blue. They are so distinctly marked that the line of junction with the common sea water may be traced by the eye. Often one half of the vessel may be perceived floating in the Gulf Stream water, while the other half is in the common water of the sea, so sharp is the line and the want of affinity between these waters; and such too the reluctance on the part of those of the Gulf Stream to mingle with the waters of the sea. In addition to this there is another peculiar fact. The fishermen on the coast of Norway are supplied with wood from the tropics by the Gulf Stream. Think of the Arctic fishermen burning upon their hearths the palms of Hayti, the mahogany of Honduras and the precious woods of the Amazon and Orinoco.

7-30 GOLD LOAN

OF THE

Northern Pacific Railroad

RAPID PROGRESS OF THE WORK.

The building of the Northern Pacific Railroad, (begun July last), is being pushed forward with great energy from both extremes of the line. Several thousand men are employed in Minnesota and on the Pacific coast. The grade is nearly completed 265 miles westward from Lake Superior; trains are running over 130 miles of finished road and track laying is rapidly progressing toward the eastern border of Dakota. Including its purchase of the St. Paul & Pacific Road, the Northern Pacific Company now has 413 miles of completed road and by September next this will be increased to at least 500.

A Good Investment. Jay Cooke & Co. are now selling, and unhesitatingly recommend as a profitable and perfectly safe investment, the First Mortgage Land Grant Gold Bonds of the Northern Pacific Railroad Company. They have 30 years to run, bear seven and three-tenths per cent. gold interest (more than 8 per cent. currency) and are secured by first and only mortgage on the ENTIRE ROAD AND ITS EQUIPMENTS and also, as fast as the Road is completed on.

23,000 Acres of Land to every mile of track, or 500 Acres for each \$1,000 Bond. They are exempt from U. S. Tax; Principal and Interest are payable in gold; denominations: Coupons, \$100 to \$10,000; Registered, \$100 to \$10,000.

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Sinking Fund. The proceeds of all sales of Lands are required to be devoted to the repurchase and cancellation of the First Mortgage Bonds of the Company. The Land Grant of the Road exceeds Fifty Million Acres. This immense Sinking Fund will undoubtedly cancel the principal of the Company's bonded debt before it falls due. With their ample security and high rate of interest, there is no investment, accessible to the people, which is more PROFITABLE OR SAFE.

Exchanging U. S. Five-Twenties. The success of the New Government 5 per cent. Loan will compel the early surrender of United States 6 per cents. Many holders of Five-Twenties are now exchanging them for Northern Pacific Seven-Thirties, thus realizing a handsome profit, and greatly increasing their yearly income.

Other Securities.—All marketable Stocks and Bonds will be received at their highest current price in exchange for Northern Pacific Seven-Thirties. Express charges on Money or Bonds received, and on Seven-Thirties sent in return will be paid by the Financial Agents. Full information, maps, pamphlets, &c., can be obtained on application at any agency, or from the undersigned.

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The Railroad Record.

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T. WRIGHTSON, - - - - }
A. J. HODDER, - - - - }

CINCINNATI, - - THURSDAY, JULY 13, 1871.

The Railroad Record,

PUBLISHED EVERY THURSDAY MORNING,

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OFFICE—No. 167 Walnut Street

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Stock Morals.

It is not a new thing for gigantic swindles of stockholders to be perpetrated. If it were, there would be a new crime to record. The history of almost every railroad in this country could add a mile to the long catalogue of fraud, swindle or misfortune, if you prefer to so term it, that has befallen its stockholders. Yet there is a sort of naturalness in them all that gives a color of necessity to them that takes away from them that moral obliquity that otherwise would attach.

We do not refer to the morals of stock gambling as practiced in Wall street, as recently illustrated in Rock Island. This last method is merely a question of endurance or depth of purse on the part of the different operators. Perhaps the most striking illustration, of this "game" in modern times, was the "movement" in Harlem, whereby "the Commodore" obtained the entire stock of the road and a bonus for doing so. This was the key to his present position.

Many praiseworthy schemes, have been ruined financially, and the entire stock sunk by hypothecations to meet the unfortunate disability of the managers to comply with the terms made with contractors to furnish money at a certain rate per month. This is easily accounted for; and although the results are lamentable, yet they are not marked with that moral turpitude, and do not present those demoralizing characteristics that are dishonourable in either the "Rock Island," "Harlem," or the following, which is but a sample of many cases of wholesale robbery,

made respectable by its magnitude and audacity:

THE NORTH MISSOURI RAILROAD—THE PLANS FOR GETTING IT CHEAP, ETC.

St. Louis, July 11.

The report of the city council committee to investigate the affairs of the North Missouri Railroad, which made to council last evening, has given rise to much comment today, as it discloses a state of affairs quite surprising to this community. For the first time the true history of the transfer of the state lien on this road has been made public. This lien, amounting to \$6,438,000, was sold March, 1868, not to the company, as was supposed, nor to the directory, but to outside parties, for \$200,000, who immediately sold it to the railroad company for \$9,000,000—\$4,000,000 in second mortgage bonds, five millions in paid up stock, they holding the lien as collateral security. This practically burdened the road to an extent of over \$15,000,000, and plunged it into bankruptcy. The original stock of two and a half million dollars, previous to the above transaction was intrinsically worth par, but the issue of \$5,000,000 additional ran it down to about three cents on the dollar, and it was subsequently bulldozed and heaped at the pleasure of the board. The road is advertised to be sold on the 26th of August for non-payment of interest on the second mortgage bonds, issued as part payment of the state lien, but the city and county owning half a million each of the original stock, take the ground that the second mortgage bonds and the new stock were illegally issued, and have taken steps to prevent the sale of the road, and otherwise protect their interests. The whole thing is regarded as a stupendous swindle, but the cream of the project is the Pennsylvania Central & Kansas Pacific Railroads, with some outside parties who propose to buy the North Missouri for the paltry sum of \$5,000,000, sink the original stock and a floating debt of about \$2,000,000 and get possession of a road actually worth \$20,000,000, and rapidly increasing in value. This game, however, will be effectually blocked, and the interests of the city and county as well as citizens who own about \$1,000,000 of the original stock, will be protected, if there is any virtue in law.

Personal.

It was a most agreeable surprise to us to meet in our sanctum a few days ago, our old and esteemed friend Daniel Whitcomb, Assistant Superintendent of the Louisville & Nashville Railroad.

Mr. Whitcomb has been long in the railroad profession and has passed successfully through many of its most onerous and responsible stages, he has grown up with the railroad interests of the west, and is recognized as among the most skillful railroad men of the country. Energy, the most devoted attention to business, a good social nature, united to fair abilities are the qualities that have won for him this enviable reputation, and they will take him on, we hope and believe, to the superintendency of one of the largest and most prosperous roads. His whole training fits him for such a position, and we should

like to see his fine powers brought out by the duties of such a responsibility.

Conductor Evans of the C., H. & D. road made us a short call one pleasant day this week, and amused us with some of those rich and racy anecdotes for which he is so famous, and that he gathers in his daily rounds between this city and Dayton. It is a rare good nature, that keeps a man up, in the trying profession of a railroad conductor, to that constant, cheerful point, that pleases everybody, and wins popularity with all classes of people. Yet it is an essential quality for success in this avocation. Heaven save us from traveling with a surly, or indifferent, or negative conductor.

In this possession Mr. Evans is without a superior, and adding to this admirable merit, integrity, sobriety and industry, he is one of the best officers upon this well managed road, and that is saying a great deal.

T. J. Gettier, Esq., well known in shipping and railroad circles for so many years, has received the appointment of local superintendent of the Great Western Dispatch. If experience and a full knowledge of the "ins. and-outs" of the business is of any advantage, the Great Western has secured them in Mr. Gettier. Tom is "no slouch," and if business for the line is to be secured by "get up and git" they have undoubtedly got the "right man in the right place."

H. P. Clough, Esq., so long connected with the interests of the freight department of the Broad Gauge lines between this city and New York, has been seduced from his first love, and is now fairly inducted in charge of the well known and popular MERCHANTS' DISPATCH. It would have been very difficult for the managers of the Merchants' Dispatch to have made a more judicious selection, either as to integrity, capacity, or the extent of business acquaintance. Mr. Clough has opened a new and convenient office for the accommodation of shippers at No. 36 West Fourth st. Mr. Clough will be ably assisted by E. P. Doty, as contracting agent.

We learn that D. Lyman Gibson, the well known and popular passenger agent, has been appointed Agent of the Indianapolis, Bloomington & Western Railroad. Office at No. 3 Burnet House. We don't like to say anything mean of any one, but we will venture to say that there is not a "cleverer fellow" in the whole passenger fraternity than Gibson, and that the I. B. & W. might have "gone a great deal further and fared much worse."

OPEN FOR TRAVEL.—The Albany (Oregon) Democrat says: "We are authorized to announce that the Willamette Valley & Cascade Wagon road, leading from this city to Eastern Oregon, via Lebanon, Sweet Home, Soda Springs, Fish Lake, Ochoco, Crooked River, Camp Harney, &c., is now open for travel."

The Galveston, Houston & Henderson Railroad.

The decision of the United States Supreme Court, in the case of this railroad, validates the bonds, and will, in effect, cause the road to be sold for the benefit of Cowdrey, James, and others, or, in other words, give them the road; for, holding the bonds, no other party could afford to bid against them. But it is not a lien on the Junction road, nor on the Real and Personal Estate Association. The bonds under which Cowdrey claims were:

- 1.—Mortgage of 6 per cent. due them, including ster. ex. say..... \$750,000
- 2.—Mortgage of 10 per cent. principal \$750,000 due them, including interest, say..... 1,450,000
- 3.—Mortgage of 8 per cent. principal say \$2,000,000, with int., say 3,500,000

Total.....\$5,700,000

In addition to these claims held by the bondholders and parties to this suit, there are others:

- 1.—A fourth mortgage to Robert Pulsford, on which there is due say \$150,000
- 2.—The Houston, Tyler & Trinity Railroad Company have a mortgage which is a first lien on about two miles of the Houston end of the Galveston, Houston & Henderson Railroad, say 40,000
- 3.—At the commencement of the suit the city of Galveston owned the bridge, but this is now the personal property of Cowdrey and James, say..... 100,000
- 4.—The Real and Personal Estate Association own the depot and grounds at Galveston, which are said to have cost..... 40,000

Total..... \$330,000

It is understood the decision gives to the plaintiffs the 52 miles of railroad, with all its equipments, and a claim against the State of Texas for 512,000 acres of land, subject to the Pulsford mortgage, the Houston, Tyler & Trinity mortgage, and the ownership by the Real and Personal Estate Association of the Galveston depot and grounds.

An exchange says: "The cost of a recent great strike in the Pennsylvania coal regions was something tremendous. The struggle lasted 138 days, and resulted in a loss of wages to the working people of upwards of \$20,000,000. Some 30,000 miners lost in wages an aggregate of \$10,350,000, and 40,000 other people—such as railroad employees, coal handlers, and iron workers, who were indirectly affected by the strike—lost in wages \$11,040,000 more. Adding these two sums together, we have an aggregate loss in wages of \$21,390,000."

This was only the direct loss to labor; it, no doubt, also filched from the poor, in the increased price paid for coal, and put into the pockets of dealers and operators, an equal amount. If this be true, then the cost of the strike is incorrectly stated; it should be \$42,780,000.

—The Louisiana and Missouri River Railroad, and the Hannibal and Moberly Railroad, are each striving to reach the North Missouri Railroad, at Mexico, and it is believed they will reach there about the same time—15th of July.

Toledo, Wabash & Western Railway.

The annual report for the year ending Dec. 30, 1870, shows the following earnings and operating expenses compared with 1869:

Earnings.	1869.	1870.
From passengers.....	\$1,274,539	\$1,242,891
" freight.....	2,681,235	3,009,025
" mails.....	72,049	81,993
" express.....	79,105	78,595
" miscellaneous....	145,411	132,133
Total.....	\$4,252,342	\$4,544,640

Expenditures, viz.:	1869.	1870.
Iron and superstructure	\$538,617	\$450,203
Roadway and structures	513,666	683,272
Cars, engines, &c.....	49,733	468,278
General expenses.....	1,549,386	1,654,510
Total.....	\$3,051,404	\$3,236,264

Net revenue.....	2,200,938	1,308,376
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Compared with the previous year, the gross earnings of 1870 show an increase of \$292,298; increased expenditures, \$184,859; and net increase, \$107,438.

The receipts from all sources and the expenditures on all accounts in 1870 were as follows:

RECEIPTS.

Gross revenue for 1870.....	\$4,544,640
Proceeds of stock.....	914,281
Cash from 1869.....	55,320
I. H. Knox & Co.....	91,434
Connecting roads and individuals...	33,162
Total.....	\$5,638,840

EXPENDITURES.

Operating expenses for 1870.....	\$3,236,264
Equipment.....	635,850
Construction.....	357,956
Miscellaneous (\$1,316,178 44) viz.:	
Interest less unpaid coupons.....	1,200,139
Meredosia bridge in New York....	625
Coupons, Han. & Naples Railroad	24,634
Coupons of previous years.....	25,012
Profit and loss.....	65,866
Assets of current year.....	\$356,011
Less bills payable, \$56,690	
and less overdr'n, 206,740	263,431
Total.....	\$5,638,840

The equipment of the line has been largely augmented during the year, by the addition of 636 first-class cars of various kinds, and other business facilities, which will contribute to the removal of a want that has hitherto seriously affected the business of the road. The general renewals of the rolling stock and machinery have been prosecuted systematically and thoroughly, so that they are now in a superior condition of efficiency.

The improvements made upon the track and superstructure have been unusually extensive; over 81 miles of new iron have been laid with fish-joint, and about 70 miles of old rails have been mended and replaced. The general roadway has been much improved by more thorough ditching and the removal of perishable structures and the substitution of permanent ones.

During the year, the Decatur & East St. Louis Railroad Company was merged into the Toledo, Wabash & Western company, by an act of consolidation; owing, however, to the lateness of the completion of the road and the incomplete warehouse and station accommodations, its value as an auxiliary has been but partially disclosed.

In the month of June, the Hannibal & Na-

ples Railroad, together with its branch to Pittsfield, passed into the control of the Toledo, Wabash & Western company. It should, however, be stated that the earnings and expenses of said railroad are wholly excluded from those of the Toledo, Wabash & Western Railway. The control of this line to Hannibal insures to the main line the almost exclusive traffic of the rich and productive country lying between the Illinois & Mississippi rivers, and the still more important object the final establishment of a great through route between Toledo and Kansas city.

The superstructure of the iron railway bridge crossing the Mississippi at Hannibal is now being placed in position and the construction work upon the only remaining link of the line, between Hannibal and Moberly, is rapidly advancing to completion and will be completed during the coming summer, arrangements having already been perfected for the control of this bridge and the line west of Hannibal, their completion secures the continuity of the Toledo, Wabash & Western Railway between Toledo and Kansas city, and gives the shortest and most practicable line between the lakes and the South-west.

With a view to further strengthen their position, the company have effected favorable arrangements for the control of the road now in process of construction between Decatur, Lincoln and Pekin. It is expected that this line will be opened for business early in the autumn of 1871.

The early completion of the new railroad from Lafayette to Bloomington is looked forward to with interest. This line, like the last one referred to, passes through the most productive counties of Illinois and Indiana, and will secure to the Toledo, Wabash & Western Railway a large traffic in grain, &c, which will naturally seek an outlet east by way of Toledo.

The company are now operating 631 miles of road, viz. : the main line (in Ohio 75.5, in Indiana 166 9, and in Illinois 212 4), 454 8 miles; the Keokuk branch, 41.2 miles; the Naples branch, 4 miles; the St. Louis division, 109 miles; and the Camp Point & Quincy (leased), 22 miles. The weight of iron averages 60 lbs. to the yard.

The equipment of the company at the close of 1870 consisted of 130 locomotives and the following cars: passenger 54, sleeping 3, directors' 1, smoking 4, mail and baggage 33, box freight 1,696, stock 391, platform 280, coal 406, caboose 52, and others 58—total, 3,111. Engine houses, 13; stations, 120.

New iron put in track, 81.2 miles; iron repaired and replaced, 76 5 miles; new ties put in track, 310,290; new passenger buildings, 2.

INCOME ACCOUNT.

Balance of net income.....	\$1,308,376
Income account of 1869.....	540,956
Capital stock.....	3,166,855

Total resources.....	\$5,016,187
Construction and equipment.....	\$994,400
Construction and equipment.....	1,225,159
Discount on capital stock.....	2,252,573
Profit and loss.....	65,866
Balance carried to next year.....	478,187

Total.....\$5,016,187

The company commence the year 1871 with materials, fuel and other available assets to the amount of \$691,849 23, in which are included material and fuel, \$292,835 52; cash, \$173,231 97, &c.

The company is entirely free from floating debt.

The Narrow Gauge.

PHILADELPHIA, June 20, 1871.

SAMUEL WILKESON, Esq.,

Secretary Northern Pacific Railroad:

The subject of railways with gauges narrower than the present standard has already, in this country, become of very great importance, and many professional and amateur engineers have rushed into print with statistics to show the immense superiority of such roads, in economy of construction, and actual carrying capacity. It has been reserved for the Denver & Rio Grande Railway to demonstrate, practically, how such economy is effected, and in what manner it is proposed, and to make their road, constructed on the three feet gauge, as efficient in point of carrying capacity, as roads of standard gauges as at present conducted.

While the discussion has proceeded in papers, magazines and pamphlets, the builders of the Denver & Rio Grande line have been steadily at work, until now the first 80 miles of the line is graded, bridged and tied; rolling stock completed, and nothing but the perverse delays in the arrival of the iron hinders the completion of the road and its opening for traffic.

The construction and capacity of this rolling stock alone furnish the solution of these two questions of economy and capacity, and the statistics below given will prove of very great interest to every one who knows what a railway is.

The engines adopted for this gauge are of the same patterns as the standard engines in use on the Pennsylvania Railroad, with but slight modifications, and were adopted after a careful comparison of those in use on both foreign and home roads.

The passenger engines have four driving wheels of 36 inches diameter, and one pair leading wheels; cylinders, 9x16 inches; weight on drivers, with water in the boilers, 20,000 pounds; total weight, 25,000 pounds. A four wheeled tender accompanies it, weighing 15,000 pounds empty.

Freight engines have six driving wheels, 36 inches diameter, with one pair leading wheels; cylinders, 10x16 inches; weight on drivers, 25,000 pounds, and a total weight of 30,000 pounds. Tender weighs 15,000 pounds empty.

In the construction of passenger cars, there has been perhaps too much deference paid to prejudices in favor of existing patterns to obtain the full benefits of the narrow gauge system. These cars have the following dimensions: Length, 35 feet; length, including platforms, 40 feet; height inside to center of dome, 7 feet 9 inches; diameter of wheel, 24 inches; height of floor beams above rail, 27 inches; capacity, 35 passengers. These cars are handsomely finished in the style of the Pullman car, and give the same seating room as the cars of the Pennsylvania road. They are thoroughly ventilated and comfortable, and are eight wheeled, with an arrangement of springs which makes them very easy on track. Their weight is 16,000 pounds. Freight cars are made of present patterns, but are four wheeled. They weigh but 4,000 pounds, while having a capacity of 10,000 pounds.

This is but a short and imperfect description of this rolling stock, but is necessary to a ready comprehension of results given below—results based on actual comparison of actual power of engines and actual weights of rolling stock on the 3 feet and 4 feet 8½ inch gauges respectively.

We have taken the Pennsylvania Railroad

for purposes of this illustration, because it is ably managed and near at hand. The standard passenger engine in use on that road has a weight on drivers of 40,000 pounds, or just double the capacity of the engine on the Denver & Rio Grande, but has a total weight, including tender, of 105,000 pounds, or 52½ tons.

Their usual local passenger train consists of:

	Tons.
4 passenger cars, seating 53 passengers each, and weighing each 40,000 pounds, or 20 tons	80
1 baggage car	14
1 engine and tender	52½
Total	146½

This train will accommodate 212 passengers, if full.

To carry the same number of passengers on the three feet gauge, we require:

	Tons.
6 passenger cars, seating each 35 passengers, and each weighing 8 tons	48
1 baggage car	4
1 engine and tender	20
Total weight	72

or less than one-half the total weight of the train on the standard gauge. Then, since the smaller engine has one-half the power of the larger, it follows that it can readily take its load wherever the larger engine can go; and, on the authority of M. Baird & Co., who from their long experience may certainly be considered trustworthy in such matters, can take it at a speed of 36 miles per hour as readily as the other can run 40 miles per hour.

But follow this out in freight traffic, which is the paying traffic of any road, and see the result.

The capacity of the freight engine on Three feet gauge is, on average low grades	405 tons
Deduct weight of engine and tender 22½ "	

Leaving for load	382½ tons
Cars weigh 2 tons to carry 5 tons, of this load then 2-7 would be cars, or say	108 tons

Leaving for paying freights	270 tons
On standard gauges freight engines having double the weight on drivers will have double the capacity, or	810 tons
Deduct engine and tender	60 tons

Leaving for load	750 tons
Cars weigh 10 tons and carry 10 tons, then of load one-half will be weight of cars	375 tons

Leaving for paying freight	375 tons
----------------------------------	----------

This shows an actual capacity for the narrow gauged freight engines of nearly three-fourths that of an engine of more than 2½ times its weight.

But we have supposed, in this case, that cars on both gauges are always filled, which, unfortunately, is far from being the case. Statistics show that on the standard gauges more than four tons of dead or non-paying weight are annually carried over these roads to each ton of paying freight. In other words, the average amount of freight carried in each car is but one-fourth of its capacity. Allowing that this discrepancy may extend to the three feet gauge also, which, from the smaller size of cars, can scarcely be expected, and this is the result:

3 feet Gauge.

Cars weigh 2 tons and have capacity of 5 tons
Then in load as above of382 tons
There will be weight of cars234 tons
Leaving weight of paying freight.....146 tons

4.8½ Gauge.

In load as above of.....750 tons
Weight of cars.....600 tons
Weight of freight.....150 tons
or only 4 tons more than on the narrow gauge.

This then is the practical result of the narrow gauge theory, and from this follow naturally all the principles of economy in construction and operation, cheap freights, large dividends, its adaptability to other than mountainous countries, the feasibility of doubling the number of miles of our railway systems at no more than former outlay, the easy development of sparsely settled but valuable districts, and all the long train of advantages which will accrue to the stockholders of such paying roads as well as to the people along their routes.

LOOK BEFORE YOU DRINK—STARTLING AND HIDEOUS CREATURES IN THE WATER.—Since the clear water supply has become permanent, our citizens are constantly shocked on drawing a bucketful of water, to find insects, minnows, and other animated and inanimated matter sporting and floating in the sparkling fluid.

Many blame this frequency of occurrences to the foul condition of the pipes, but this is a mistake; these unpleasant things existed under the old system, but were not discovered because the color, shade and consistency of the water prevented seeing the inhabitants, and consequently, unobserved, they were taken into the drinker's organs.—*St. Louis Jour. Com.*

We congratulate our St. Louis friends on their ability to see before they swallow. It would not be of much use to look here. We may, therefore, as well, and do, "go it blind." Perhaps where

"Ignorance is bliss,
T'were folly to be wise."

Such, at least, is the opinion of our water works and city officials. As Bro. Moody would say, "God bless them, and give them a realizing sense of the situation."

SETTLING THE "NEW NORTH-WEST."—The St. Paul *Pioneer* makes the following statement in regard to emigration: The roads leading to the Red river valley are literally covered with emigrant wagons with their usual accompaniments of families, furniture, and stock of all kinds. The wagon roads from Sauk Center to St. Peter show daily accessions to the vast caravan wending its way to the fertile regions of northern Minnesota. The extent of the great incoming tide of humanity can be best estimated on the main road between Alexandria and Pomme de Terre. Two hundred wagons per day pass over this portion of the route north-west, and the camp fires are seldom allowed to go out—a fresh train of emigrants arrives almost as soon as its predecessor has resumed its march. A noticeable feature of this year's emigration is its quality—the wagons come loaded with household goods and farming implements, and are followed by herds of cattle and other stock which in quality would do credit to any country.

The Denver Narrow Gauge Road.

This is the most important experiment that the new school of railway construction has yet made. We have received a pamphlet published in London, entitled "The Denver & Rio Grande Railway of Colorado and New Mexico, with a map;" and we understand from Mr. Howard Schuyler, secretary of the company, that its bonds have been favorably placed by the bankers of London, which secures the completion of the whole line.

The organization of the road is as follows:

Directors—General William J. Palmer, of Colorado; Robert H. Lamborn, of Philadelphia, Pa.; William P. Mellen, of New York; A. C. Hunt, ex-governor of Colorado; General Thomas J. Wood, of Dayton, Ohio.

Officers—William J. Palmer, president; R. H. Lamborn, vice president; Howard Schuyler, secretary and treasurer; Saml. E. Brown, solicitor; William H. Greenwood, manager of construction; J. P. Mercereau, chief engineer.

Trustees for the Bondholders—John Edgar Thomson, president Pennsylvania Central Railroad, Philadelphia; Samuel M. Felton, Philadelphia, Wilmington & Baltimore Railway, Philadelphia; L. H. Meyer, New York.

The published description of the country through which the road will pass states that the elevation of Denver city above tide is 5,200 feet; that of Santa Fe 7,100 feet, that of Chihuahua 4,368 feet, and that of the city of Mexico 7,990 feet. It is a mountain land of pine forests, broken by enclosed plains, called parks, and extensive valleys of great beauty and fertility. Coal beds crop out along the eastern foot of the mountain range. The mountains themselves are rich in iron, gold, silver, lead, copper, zinc, limestone, granite, and clays.

The road is intended to run from Denver city southward along the outcrop of the coal, a hundred miles, past Colorado city; then enter and ascend the valley of the Arkansas river, south-westward, to Canon city, and westward, forty miles, to Poncho pass. Here it resumes its southerly course; crosses the mountain divide, and gets upon the extreme head waters of the Rio Grande in Homan's park. This part of the line is thirty miles long.

The rest of the way the road follows the Rio Grande, south, for 140 miles, crossing four considerable rivers, which enter the great river from the east; the last two of these branches being the Calora and Arroyo Honda. The course of the road now becomes S. 30° W., and still along the east bank of the great river; past San Juan, 60 miles, where it has Santa Fe to the east of it, distant 15 miles, San Felipe, Bernalillo, Atresco, and Pajarito, where it crosses to the west bank of the river. This point is 250 miles south of the Arkansas river.

Here the line crosses at right angles the proposed line of the Atlantic & Pacific Railroad (coming up the Canadian fork, and head waters of the Rio Pecos, by Fort Builer, and Anton Chico, through the Canon Blanco, by Albuquerque).

The line of the Atlantic & Pacific Railroad westward from where it crosses the Rio Grande (and Denver & Rio Grande Railroad), at Pajarito is up the long valley of the Rio San Jose (a branch of the Rio Grande), by Palmer's surveys, to Campbell's pass, north of the Zuni range of mountains, and south of the Sierra San Mateo.

The railway under notice will be completed and in running order from Denver city to Colorado city, 80 miles this month, securing

the trade of the Platte canon, and of the mines and forests of the South park. This secures the Lake pass, the only practicable crossing of the divide between the Platte and the Arkansas rivers. Grading has been commenced in the Arkansas canon, 50 miles from Colorado city, the most important entrance into the park country, and into the southern and western mining districts of Colorado. The passenger and freight traffic of the Rio Grande will be at once diverted to this new route.

The description given of this canon by the adventurous engineers of the road, endeavoring to discover some possible location line for it through the great canon, would impress even an expert who had been engaged on the Seemering, Bolsen or Santander lines in Europe. Mr. Schuyler and his party were three weeks in the canon, entering it first at one end, and afterwards at the other. But there still remained half a mile of it midway between the two ends entirely inaccessible. Ice was on the river and on the rocks; his men finally refused to proceed, and left him and his companion to fight it out by themselves. Subsequently a more favorable season was selected, and a second attempt to obtain a line succeeded.

This remarkable mountain pass is 8 miles long, and the river falls 400 feet in these 8 miles, flowing with great violence between vertical walls of primary rock. The highest point of the upper edges of these walls was found to be 1,600 feet above the water below. This was ascertained by horizontal observations of it made from points a little higher and lower than it, along a line run across the mountain land for the purpose of connecting the two ends of the canon before any line could be got through the canon itself. The river sweeps alternately the foot of one wall and then of the other, and in these bends or intervals there is always a talus of broken rock fallen from above. The dangers attending the first exploration, in winter, may be imagined.

The railroad finds footing upon the ledges of the wall, and on the talus where it exists, and passes the river twice by bridges. Perhaps there could not be found another specimen of ground so well adapted for bringing out all the virtues of the narrow gauge under difficulties. Mr. Schuyler informs us that the construction of these eight miles through the canon will be accomplished in three or four months from the time of commencing work upon it.—*U. S. Mining Register*

MEMPHIS & OHIO RAILROAD—The directors of this company have passed a resolution requesting "that the formal articles of consolidation between this company and the Louisville & Nashville Company shall be entered into in accordance with the terms set forth in said agreement on or about the first day of October, 1871." The road has long been operated by the Louisville & Nashville company, forming its route to Memphis and its connection to the New Orleans and Mobile routes.

—Articles of agreement for the consolidation of the new Chicago, Canada & Southern Railway Company and the North-western Ohio Railway Company were filed at Indianapolis on the 9th inst. The name of the new company will be the Chicago & Canada Southern. Capital \$3,000,000, in \$100 shares. In the consolidation, the stockholders in the North-western Ohio company receive one share in the new company for every two held by them. It is understood the new consolidation is in the interest of Erie.

The Future of our Railroads.

A correspondent of the Cincinnati *Gazette* (E. D. M.), writing from Fishkill on the Hudson, says:

But this eternal "motion" brings us to another very practical thing. It is the increase and the power of railroads. First let us look at the increase of railroads. The last return of railroads (January, 1871) gave 53,000 miles of railroads in this country. Of this amount 23,000 miles were made in the last ten years. But the most important fact is that 6,000 miles were made in the past year. At the same rate we should make the enormous amount of 60,000 miles in the next ten years! If we may judge by what is now going on, there will be even more; for it is easy to see that in the years 1871 and 1872 railroads will be made at a greater rate than in 1870. There are in almost every State new lines constructing, and one has only to look at the New York papers to see the mortgage bonds of dozens of companies advertised, and all of them apparently successful. If we look into the causes of this we shall find one leading cause to be the abundance and cheapness of money, which is indirectly brought about by the action of the government. The government is actually yielding to the money market two hundred millions (\$200,000,000) per annum, which it did not yield three years ago. Half of this is in payment of the public debt, and the other half in the reduction of taxes. Again, the immense accumulation of gold in the last twenty years has begun to be felt in all the money markets throughout the world. Money is discounted in the Bank of England at 2½ per cent., and on call in New York at 3 per cent. On first securities it can be had at 6 per cent. In France the whole installment of the German indemnity was taken up by the middle class of people. With the reduction of government demands of \$200,000,000, with the industry of the country in full activity, and with the money markets overflowing, it is plain that good railroad schemes can get any amount of money at reasonable rates. Hence, railroad construction, especially west of the Mississippi, will go on with unprecedented activity. Here are some signs in the oldest districts of country, which are quite remarkable. "H. V. B.," in the *Gazette*, details several railroad branches and additions, which are to make Washington (the capital) accessible to the people from every side. This would cost millions. Then, here, in the oldest part of New York, there are four new lines of road making (including the Hartford & Erie, which, though bankrupt, is to go on), besides a bridge over the Hudson, which seem certain to be made. In Ohio, there will be at least five hundred miles of new road—if we dare include the continuance of the Chesapeake & Ohio, of so great interest to Cincinnati. Beyond the Mississippi the number is legion. The great Northern Pacific is going on with power and rapidity. Immigration, if nothing else, will make that go. Through Minnesota and Dakota is pouring on the great tide of immigration, so that the lands, which there are good, will make the road. Unless some act of Providence prevents it, we shall make 60,000 miles of railroad in the next ten years.

Much has been said against the land grants to railroads—perhaps with reason. But there will be one practicable good attending it—the roads will be made and the country settled. A philosopher might ask, "What is the need of settling it so fast? Your new lands will be exhausted in a few years." Exactly. But an

American does not ask what is to happen in the next generation. He is a spendthrift of prosperity. He is only following the law of "go," and the faster the "go" the better for him.

Well, you may now ask, "What is all the railroading coming to?" We could not do without it, if we looked to the mere transportation of western produce. But there is one thing seems to strike almost every one now a-days—where is the regulator? If any one of the States, like Ohio, were to attempt to regulate railroad fares and conditions, it would very soon run against what the courts call "vested rights," and therefore the general regulation of the roads can not be made, unless we go to the National government, and that I should be very sorry to see. Ohio can do something by way of police, and consistent with its charters, which I wish were done.

But a far greater evil is putting the whole freight business of the country in the hands of half a dozen companies—we may say of half a dozen men. There are 53,000 miles of railroad, and 4,000 miles, in the hands of three or four companies, control all the rest, by controlling the great markets. This is a subject for future consideration. As to Cincinnati, it is now completely under the control of three companies, and has absolutely nothing to say as to what railroads shall do. The Little Miami sold itself to the Pennsylvania, and the Marietta to the Baltimore road, and Cincinnati people have now nothing to say about these foreign corporations. These railroads are good in themselves; but it is humiliating to see the great city of Cincinnati powerless in the hands of half a dozen men of New York and Philadelphia. Kentucky buffers her on one hand, and New York and Philadelphia buy her up on the other.

The New Narrow Gauge Engines now Building at the Baldwin Works—The New Theory Successful.

The Baldwin Locomotive Works of M. Baird & Co. of this city, are now building some narrow gauge locomotives for the Denver & Rio Grande Railroad, on the new principle of the very narrow three foot gauge. The first of these engines has just been completed, and is now at the works, from whence it will be forwarded in a few days to its final destination. It is called the Montana, and is the first locomotive of narrow gauge for general passenger or freight service ever built in this country. Its completion signalizes the "new departure" in railway practice, and consequently great interest is naturally attached to it.

The engine is six wheeled, four of the wheels, 40 inches in diameter, being coupled as drivers, and one pair of leading wheels in front having a swing bolster and radius bar, forming what is known as a "pony truck." This arrangement enables the engine to pass short curves readily, as the rigid wheel base is only six feet three inches. The general plan is similar to that of ordinary full gauge locomotives. The cylinders are outside, and placed horizontally, and are 9 inches in diameter by 16 inches stroke. Its total weight in running order is 25,300 pounds, of which 20,500 are carried on the four driving wheels, and so are available for adhesion. A four wheeled tender, having a water capacity of 500 gallons and a coal capacity of about one and a half tons, is attached.

The proportion of driving wheels relatively to the stroke of piston admits a speed of 30 to 40 miles an hour, with a facility equal to that on the full gauge.

In addition to this, two other locomotives of the same gauge are now finishing for the same road, which are intended for freight service exclusively. They have each three pairs of drivers and a pony truck.

As an evidence of the great interest now prevailing on the narrow gauge question, as well as of the great business connections and prominent standing of this Philadelphia manufacturing firm, this establishment now holds contracts to furnish locomotives for quite a number of narrow gauge roads, both in this country and Canada. The firm also receive by every mail letters and inquiries for information on the subject from all parts of the United States, from Mexico, from the British Possessions, from South America, and from Americans residing in India and China.

Railroad Building in California.

The San Francisco *Bulletin* says that with the opening of summer there is renewed activity in railroad building in California. In the lower part of the state, besides the Southern Pacific, which is going ahead beyond Gilroy, work has been resumed on the San Joaquin Valley, already completed twenty miles beyond Stockton, and forty miles additional will be finished during the present season. The Copperopolis Railroad, built for twenty-eight miles from Stockton, is also to be pushed forward. Here we have two railroads, on nearly parallel lines, now under way in the San Joaquin Valley, pushing for the southern extremity of the state; while on a line nearer the coast a third road, the Southern Pacific, is advancing in the same direction. The commencement of the Texas Pacific from San Diego may be reckoned as one of the certain events of the season. What may be done with the project for one or two branch lines to intermediate towns on the coast remains to be seen.

North of San Francisco, a large force is at work grading for the Sonoma branch of the Vallejo or California Pacific Railroad. A report is current that a contract has also been let for 145 miles of the Eastern extension of this road, reaching from Davisville, a few miles south-east of Sacramento, to a point in the Upper Sacramento Valley near Shasta. The report is probably premature. This section of the Eastern extension will be entirely on the west bank of the Sacramento river. On the east bank, the Oregon branch of the Central Pacific is already in operation and one hundred and twenty-seven miles north of the state capital, and is to be extended to the Oregon border, about two hundred miles further.

Altogether, there will be considerable railroad building in California this season, widening the field for labor and extending the facilities of cheap and rapid communication. A much larger proportion of the agricultural region than ever before will be accessible by rail before another farming season opens.

—The speedy completion of the Laclede and Fort Scott Railroad was made the subject for the consideration of the County Courts of Laclede, Dallas and Polk counties, recently, and an order was issued by Polk County Court to issue bonds subscribed, as fast as the work progresses.

—The St. Louis and Southern Railroad commence running trains through from Evansville to Mt. Vernon, Ind., on the 1st, and through to the Wacoash by the 15th. By the 1st of November trains will run through from St. Louis to Evansville.

The Great Bridge over the Missouri between Council Bluffs and Omaha.

At Omaha an iron bridge is being built by a bridge company for railroad and other travel, across the Missouri. It is to rest on eleven piers, 250 feet apart, making the bridge full 3,000 feet in length. Its height from low water to rail will be 60 feet. Each pier consists of 2 round iron tubes, 8 feet in diameter, 2 inches thick, and extending down to solid foundations 70 feet below the bed of the river. The last of these tubes is now being sunk.

THE TUBES.

They are put together in sections of 10 feet each. One end is closed by an air-tight cap; the open end is forced by its own weight into the sand, pneumatic pressure is applied to the inside, forcing out the water to the bottom of the tube, where the air will come up in bubbles outside.

Men then go to the bottom of the tube, remove the sand, and allow the tube to sink. Sections are added as the tube descends. If it will not sink by its own weight, pressure is applied to the top by heavy weights, after the manner of the old fashioned Yankee cheese press. The sand is removed either through a small tube from the bottom by pneumatic pressure, or it is brought up in bags. The deeper the tube is sunk, the greater is the pressure required to keep the water out at the bottom.

THIS PRESSURE

has often amounted to 42 pounds to the square inch. Many men can not endure it, blood bursting from the nose and ears. Three times the amount of food is required for the laborer here than would be necessary outside. But how is it done? Let me explain farther.

A LABORER

enters a small iron box in the tube, and closes an air-tight door behind him. Then he enters the main tube and closes another door behind him and proceeds to his work. Powerful air pumps are continually forcing the air into the tubes at the top. The two tubes of each pier are placed 10 feet apart giving 26 feet for the width of each pier, including the space of 10 feet. When the tube is cleared of sand to the rocky foundation, it is filled to the top with solid stone masonry.

THE IRON SUPERSTRUCTURE

will be nearly like that of the bridge at Burlington, on the Mississippi. No ice breakers are necessary; the piers themselves have proved of sufficient strength to resist every thing of this nature. When completed it will be a noble structure and one of the points of the West.—*Eve, Mail.*

CONSUMPTION OF GOLD AND SILVER.—The sales of silver in New York, for consumption by manufacturers of silverware, including bars of refined, and Mexican dollars, are said to aggregate \$5,000,000 annually. Including the consumption of precious metals by manufacturing jewelers of all sorts, this aggregate is increased several fold, the estimate of New York being alone \$15,000,000; that is to say, \$5,000,000 in silver and \$10,000,000 in gold; and this is exclusive of what is known as "rolled stock," or ribbons. The fact is ascertained that there is more silver used for domestic purposes in the United States than any other country in the world.—*Exchange.*

Narrow Gauge Railroads.

We have lately published much important information, in reference to Narrow Gauge Railroads, and we now direct the special attention of our capitalists, to the following valuable views of the question in a financial point, for which we are indebted to Messrs. Paul Brothers, Civil Engineers, Akron, Ohio, who are thorough practical men, and who have made a specialty of this system.

As we have already stated, it must be clearly understood at the outset, that the construction of Narrow Gauge Roads is not advocated for main trunk lines, but simply as tributary roads—as feeders to the great railroads.

The views of our correspondents on these roads (which can be cheaply constructed and operated) are very explicit and to the point, and meriting the serious attention of railroad men:

In this age of steam and iron, one of our greatest aims is to obtain a rapid as well as a cheap system of transportation.

In England and other older countries, the turnpike system had made considerable progress before the introduction of railroads, and as a natural consequence, there has always been a general desire to make a locomotive that would operate upon common roads and it is now nearly perfected as far as the mechanical combination; but the result is such that it can not practically compete with railroads nor be brought into general use, on account of the resistance of vehicles upon these roads being so much greater, than over the smooth surface of iron rails, which we illustrate by the following table which is the result of an elaborate series of experiments by Sir John McNeil. It being for

Stone pavement.....	29	41-100 lbs. per ton
Broken stone road.....	58	82-100 " "
Gravel.....	133	3-10 " "
Soft sand and gravel.....	285	7-10 " "
Upon iron rails.....	8	" "

By reference to this table, it can easily be seen that the reason why road steamers have never nor can never be profitably introduced for general traffic, is not altogether because of defective machinery, but because the resistance is so much greater than upon iron rails, it being over sixteen times greater upon the ordinary gravel road than upon the iron rail: another objection being, that it costs nearly as much to construct a good turnpike, as it does to construct a railroad.

In this country, railroads are generally introduced before turnpikes of good quality are constructed; but a scarcity of means, often induces the people to try to economize in construction of railroads, and heretofore this system of economy has not been carried in the right direction, the course generally taken being in inferior work and cheap materials; and we desire here to show why railroads of this class have been a failure, by giving a history of the manner in which a great many of our railroads have been built, and why they have cost so much.

In the country through which the line is required, some of the leading citizens taking hold of it, are enabled to organize a company and raise a stock subscription of say, \$4,000 per mile, upon a line of one hundred miles in length. After spending a portion of this, the President of the company collects numerous statistics, showing the great amount of traffic the road is likely to have when finished, and furnishing himself with plans and profile of the line, goes to New York to sell the First Mortgage Bonds; there he finds it

is not an easy matter, to get what he considers a fair price for them, as they are not in great demand, and the supply is abundant, there being railroad bonds there for sale from almost every section of the country, and bondholders of his description are as thick as Brigadier-Generals were in Washington during the war. But being a pretty shrewd financier, he finds purchasers for bonds to the amount of \$10,000 per mile, at 85 cents, realizing \$850,000 upon the whole line, and issuing \$1,000,000 in First Mortgage Bonds to pay for it. Having this amount of money, work is begun in good earnest, but knowing that he must economize, an inferior quality of iron of 50 pounds per yard, is purchased, and when track-laying is begun, the contractor who lays the iron is to have the use of a locomotive and rolling stock, to deliver iron, ties, etc., and the iron is first laid upon four ties to each rail, over which the locomotive is allowed to pass, to bring more ties and iron, the track being laid upon clay without ballast, the condition of the rails can be imagined; as soon as it is laid to the first station, regular trains are started, but before the road is finished, more money must be raised, having spent \$4,000 per mile of subscription, and \$10,000 per mile in bonds; \$8,500 per mile, of this, being spent upon the road, and \$1,500 being discount upon the bonds.

We furnish an estimate of the cost of building the road:

	Per Mile.
Grading, etc.....	\$3,000
Iron, 50 lbs., per yard.....	6,280
Ties, 2,640 per mile.....	1,056
Bridges	1,000
Joints and spikes.....	750
Track laying.....	400
Water stations.....	100
Engineering, etc.....	500
Sidings	750
Total for 1 mile.....	\$13,836
Total for 100 miles.....	\$1,383,600
6 Locomotives.....	\$75,000
105 House cars.....	89,000
105 Gondolas.....	68,250
4 Passenger cars.....	20,000
4 Exp. & baggage cars...	8,000
Buildings.....	55,000
	\$315,250
Total.....	\$1,698,850

This estimate shows the actual cost of construction to be \$16,988 per mile, and having raised the sum of \$12,500 per mile, there is a balance of \$448,850 required to finish the line.

To raise this amount, it becomes necessary to issue another set of bonds, and the President starts again to negotiate the Second Mortgage Bonds; this time he is doubly fortified with statistics, being prepared to show that the road has already or is about to declare a dividend, but, in order to accomplish this, he has charged all running expenses to construction account; but he soon finds this figuring does not answer as well in New York, as it does with his stockholders, and the fact that capitalists can not fully satisfy themselves, that the net earnings will more than pay interest upon the bonds already issued, has a tendency to reduce the value of the last bonds; but at last he succeeds in disposing of them at 33 cents per 100, and to raise this amount of money, it would be necessary to issue \$1,345,800 in bonds. With

this amount, he is enabled to finish the road at a cost of

\$400,000 Subscription;
1,000,000 First Mortgage Bonds;
1,345,800 Second Mortgage Bonds.

\$2,745,800 for 100 miles, or \$27,458 per mile, the actual cost for construction being \$16,988, and the cost for raising the money \$10,470, and, when finished, he has a road without ballast or fence, with very little rolling stock; light iron, often bent in such a manner as to be almost worthless, and with a traffic that is not one-tenth part of what a road properly built would be capable of doing, if it had the necessary rolling stock, and in order to make it pay expenses, the freight tariff has to be so high, that the people along the line who sacrificed their money in the stock are scarcely any better off, than when they hauled their produce and merchandise by team to distant markets.

With such a prospect as this before a company, would it not be well for them to consider the advantages of a narrow gauge, in regard to economy of construction and subsequent operation, and as both these questions have been thoroughly investigated, and in every instance have been proved, that it is cheaper to build and operate a narrow gauge railroad, than one of the ordinary gauge.

We will see, by the following actualities, what would have been the result had a 3 feet gauge been adopted:

	ESTIMATE OF COST OF THREE FEET GAUGE.
	Per Mile.
Grading, bridging etc.....	\$3,000
Ties, 2,640 per mile.....	660
Iron, 30 lbs. per yard.....	3,762
Joints and spikes.....	386
Track-laying.....	250
Ballast	500
Sidings.....	500
Engineering, etc.....	300
Total for 1 mile.....	\$9,358
Total for 100 miles.....	\$935,800
8 Locomotives.....	\$56,000
250 House cars.....	46,250
250 Gondolas.....	41,000
Passenger & baggage cars	12,000
Buildings, machinery, etc.	50,000
Water stations.....	10,000
	\$215,250
Total.....	\$1,151,050

With a local subscription of \$400,000, it would require \$751,050 to be raised. This would require the issuing of \$883,558 in bonds, at 85 cents. This amount, added to the subscription, would make a total cost of \$1,286,588 for the 100 miles, or \$12,865 per mile.

Such a road would be just as capable of doing all the business that would be offered as the wider gauge, and we have this road in good order, ballasted. Under these circumstances the company could afford to carry freights at such rates as to build up a traffic that would make it profitable for the stockholders, and a general benefit to the community through which it passes.

—The Midland and Mackinaw is the name of a new narrow gauge company, proposing to build a road from Midland, Mich., on the Flint and Pere Marquette Railroad, 19 miles north-west of East Saginaw, north westward about 50 miles to Houghton Lake, and thence, eventually, due north to the Straits of Mackinaw.

Railroad Decision.*Railroad Companies—What Liabilities they may incur under their Charter—Powers of Road Superintendent.*

The facts in the recent case of *The Toledo, Wabash & Western Railway Company vs. Rodrigues* (47 Ills. 188), are fully and clearly stated in the following opinion by

WALKER, J.—It appears, from the record in the case, that one Johnson, while in the employment of the railroad company, as a brakeman, was run over by a locomotive and injured. That the station agent at Jacksonville, where the injury occurred, employed appellee to nurse and take care of Johnson, and told appellee that appellant would pay him for his services. Appellee performed the services and presented his bill to the station agent for payment. He wrote to the general superintendent, making a full statement of all that had been done, but there seems to be no evidence that this letter was received. After the account was rendered, the general superintendent conferred with the station agent in reference to the various items and as to whether the charges were reasonable, when the superintendent said if they were reasonable he would pay the account, and made no other objections at the time.

On the trial below, and in this Court, it is insisted that these agents acted without authority, and there is no legal obligation resting upon appellant to pay for these services notwithstanding the employment by the station agent, and the recognition of his contract by the general superintendent of the road. Although the charter of the company may not in terms authorize the body to incur expense on account of injury received by their employees, in the discharge of their hazardous employment, yet it will not be seriously contended but that they may, in exercising their franchises, incur such a liability.

It, from the necessary hazards of the employment a person devoting his energies to promoting the interests of the company at a moderate compensation without fault on his part, is severely injured, and for a length of time is wholly disabled, humanity, if not strict justice, would say that when the company have employed others to take care, and incur the expense of his cure, they should be compelled to observe their contract, and meet the expense.

When an employee has been disabled and rendered helpless, in the employment of the company, we can see no reason why this is not a sufficient consideration to support a promise to pay for the nursing and medical attendance necessary to his cure, when the agreement is express and not by implication. To have that effect there should, at least, be a request to perform the service. It is not such a duty resting on the company, that any person, without authority from the company, may render the service and compel payment. The request should be express and explicit, and from a person who is empowered to act for the company.

In this case, appellee was requested to render the service by the local agent intrusted with the affairs of the company at that station. He wrote soon after to the general superintendent, informing him of what had been done. Having written in the usual course of business, we must presume that the letter was received. Again, there is no evidence that he countermanded the order, and not only so, but he, when the bill was presented for payment, recognized the validity of the contract,

and said he would pay reasonable charges for the services, and based his only objection upon the high prices charged. This, in our judgment, made a clear case for a recovery, for a reasonable compensation, if these officers had authority from the company to incur the liability.

Whether the station agent had such power or not, the general superintendent was clothed, and necessarily must be, with large specific as well as discretionary powers. As his title implies, he has a general superintendence of the business affairs of the road, and we deem it but a reasonable inference to conclude that this was within the scope of these powers, and when exercised, that the company must be held liable. The corporation is governed within its charter by the adoption of rules and regulations for the purpose. These regulations govern the action of the officers. By them they confer powers and impose duties upon their various agents and officers; and by this means they exercise their franchises. These regulations are private and not accessible to the public, and hence the difficulty of other persons showing, except by inference or circumstantial evidence, that any officer performs any act within the scope of his authority. It would, therefore, be unreasonable to require positive proof of such authority. The fact must be left to proof, as in other cases. And when it is known that the general superintendent manages all the business of his road within his department, and binds the company by contracts on its behalf, in regard to its general business, it may be safely inferred that such a contract as this was within the scope of his authority.

Although the instructions may not have been strictly accurate, we do not see that they could have misled the jury. Even if they were not all precisely applicable to the evidence, the finding of the jury was clearly right, and the rejection or proper modification of any of them could not have changed the result.

The judgment of the court below must, therefore, be affirmed.

Judgment affirmed.—*Railroad Journal.*

A Check to Railroad Concentration.

The tendency towards railroad concentration is likely to be checked in a novel and unexpected manner. The lease of the New Jersey railroads by the Pennsylvania Railroad Company, is opposed by the commercial interests of Philadelphia, and the Common Council of that city has adopted legal measures to prevent it, either by injunction or otherwise. The objection of Philadelphia to the proposed lease is, that it would necessarily shift the seaboard point of the great chain of railroads connecting with the Pennsylvania Railroad from that city to New York, to the great injury and loss of the former. This fear is, no doubt, well founded. The Pennsylvania Railroad has outgrown the influences that created it, and now requires a broader, wider access to the sea. It seeks New York by an irresistible attraction. It carries its rich freights from the West, the South, the Pacific, and the Far East, by and through Philadelphia to this city, thus, unwillingly or not, attesting its commercial and financial superiority.

But will Philadelphia succeed in opposing a barrier to the Pennsylvania Railroad in its progress towards destiny? The answer is scarcely doubtful. It would be worth while for New York to forego the advantages that are to be derived from the direct acquisition

of this vast railroad territory of nearly a score thousand miles, for sake of the whole-some example of a check upon railroad monopoly. But the Pennsylvania Railroad, which owns and controls the Pennsylvania Legislature, overrules the Cabinet and the President, and hurls Congress, is not likely to be checked in its policy by any measures that are possible even to the great city of Philadelphia.

But the spectacle of a conflict between the city of Philadelphia and the Pennsylvania Company—the creature of its bounty—is significant and important from every point. It opens the conflict of the future—the coming, inevitable struggle between the people and the great corporations. In this particular case, the managers of the Pennsylvania Railroad are clearly in the right. It was an imperative commercial necessity that they should connect their vast network of railroads with the great seaport and mercantile metropolis of the continent. But, in a great many cases, the railroad and other corporations have manifested grasping, monopolizing tendencies that are decidedly contrary to public order and the convenience of the people. It is patent to all observers that these institutions are rapidly manifesting a disposition to override all laws and regulations that interfere with their profit and interest. How to curb or subordinate corporations to their purely legitimate functions of ministering to the welfare of the people and of the State, is looming up as the question of the hour. It remains to be seen under what circumstances the contest which has been commenced by Philadelphia will be renewed and continued.

But the fact of a contest, under any circumstances, between the city of Philadelphia and the Pennsylvania Railroad Company is strange, if not ominous. The Railroad Company was originally organized by wealthy and enterprising citizens of Philadelphia, to “extend the trade of the city with the West.” But “the West” of that day scarcely extended beyond Pittsburg, and the Pennsylvania Railroad properly does not extend beyond that city. But by means of judicious leases and purchases, the Company is now the greatest in the world. Its connections extend—or will soon do so—over the United States. Philadelphia has naturally taken great pride out of this famous Railroad Company, and has undoubtedly derived immense advantage from it. Much of the prosperity of the last score years was derived from it. But this prosperity was real and legitimate, and is hardly likely to take to itself wings. We doubt whether Philadelphia will really lose anything she now enjoys by the union of the Pennsylvania and the New Jersey Railroad Companies. The ocean commerce of the West and South will, of course, pass by and through the city to New York. But it would do that in any case, and in effect does so at present. All the trade that Philadelphia now enjoys through the Pennsylvania Railroad will continue to it. For the rest, we have only to repeat that it was a commercial necessity that the great railroad of the continent should connect itself at last with the great seaport and commercial metropolis.—*Economist.*

—The St. Louis and Keokuk Railroad after a short rest, is again under way. The bridges are to be completed at once, and the ties laid down between Hannibal and the Pike county line, and the unfinished grading between Troy and the mouth of Big creek is to be completed at once. This looks like business!

SUMAC.—Among the commodities for which New York is the receiving and distributing depot, American Sumac is rapidly assuming an important position, and bids fair to soon exclude entirely the imported article, besides leaving a large amount for export after fully supplying the domestic market. This material, which enters so largely into our manufactures of dyed goods and leather, was formerly all imported, but now vast quantities are gathered in Virginia and North Carolina, manufactured on the ground and sent here. The lower grades of imported sumac have been entirely supplanted by the domestic article, and as soon as the gathering, curing and grinding shall be more carefully attended to, will no doubt supersede all grades of foreign production. The slight difference which now exists between foreign and domestic sumac is probably owing to the fact that the first is cultivated and the latter at present grows wild; but preparations are being made to cultivate the plant in Virginia on a large scale, which will very much improve its value. For tanning morocco, the native production when free from dirt is fully equal to the best foreign, but for dyeing, especially for fine fabrics, the last named is preferred. Sicilian sumac is worth in this market about \$175 per ton, and the American already demands as high as \$110 for a choice article. Lobby's store house in Richmond, once so notorious as a military prison, is now used as a factory for manufacturing sumac, and as much as \$100,000 in a single day has been paid for the leaf unground. The consumption of sumac in this country amounts to nearly 9,000 tons annually, of which we are now producing more than one-half, with a prospect of a large increase in a few years; and, as the uses to which it is put are daily increasing, the supply will probably never exceed the demand. If it should, we can ship to England where the consumption is over 20,000 tons yearly and constantly increasing, with only the Sicilian market to draw from as yet, which is liable to be closed at any moment by complications arising from the present war. This new field for the profitable employment of capital and labor is a large one and well worth cultivating. This city furnishes a market for nearly all the sumac used in the United States.

EFFECT OF OCCUPATION ON HEALTH.—It has oftentimes been asserted that those exposed to severe labor in the open atmosphere were the least subject to sickness. This has been proved a fallacy. Of persons engaged in heavy labor in out-door exposure the percentage of sickness in the year is 28.05. Of those engaged at heavy labor in-doors, such as blacksmiths, etc., the percentage of sickness is 26.54—not much to be sure; but of those engaged at light occupations in-doors and out, the percentage of sickness is only 20.80. For every three cases of sickness in those engaged in light labor, there are four cases among those whose lot is heavy labor. The mortality, however, is greatest among those engaged in light toil, and in-door labor is less favorable to longevity than laboring in the open atmosphere. It is established clearly that the quantum of sickness annually falling to the lot of man is in direct proportion to demands on his muscular power.

How true this makes the assertion, "Every inventor who abridges labor and relieves man from the drudgery of severe toil is a benefactor of his race." There were many who looked upon labor saving machines as great evils, because they supplanted the hand toil of many operatives. We have helped to cure the laboring and toiling classes of many such absurd notions. A more enlightened spirit is now abroad, for all experience proves that labor-saving machines do not destroy the occupations of men but merely change them.—*Scientific American.*

INDIA-RUBBER IS INEXHAUSTIBLE.—The belt of land around the globe, five hundred miles north and five hundred miles south of the equator, abounds in trees producing the gum of India-rubber. They can be tapped, it is stated, for twenty successive seasons without injury, and the trees stand so close that one man can gather the sap of eighty in a day, each tree yielding, on an average, three table spoonfuls daily. Forty-three thousand of these trees have been counted in a tract of country thirty miles long by eight wide. There are in America and Europe more than one hundred and fifty manufactories of India-rubber articles employing some five hundred operatives each, and consuming more than ten million pounds of the gum per year, and the business is considered to be still in its infancy. But to whatever extent it may increase, there will still be plenty of rubber to supply the demand.

Few are aware of the magnitude of the production and sale of labor-saving implements in connection with agriculture in this country. It has been estimated that the farmers of the United States annually expend between two and three millions of dollars in reaping and mowing machines. The annual production is now estimated at 125,000 machines.

7-30 GOLD LOAN

OF THE

Northern Pacific Railroad

RAPID PROGRESS OF THE WORK.

The building of the Northern Pacific Railroad, (begun July last), is being pushed forward with great energy from both extremities of the line. Several thousand men are employed in Minnesota and on the Pacific coast. The grade is nearly completed 26½ miles westward from Lake Superior; trains are running over 130 miles of finished road, and track laying is rapidly progressing toward the eastern border of Dakota. Including its purchase of the St. Paul & Pacific Road, the Northern Pacific Company now has 413 miles of completed road, and by September next this will be increased to at least 550.

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Sinking Fund. The proceeds of all sales of Lands are required to be devoted to the repurchase and cancellation of the First Mortgage Bonds of the Company. The Land Grant of the Road exceeds Fifty Million Acres. This immense Sinking Fund will undoubtedly cancel the principal of the Company's bonded debt before it falls due. With their ample security and high rate of interest, there is no investment accessible to the people, which is more PROFITABLE OR SAFE.

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The Tunnel Entrance.

From the first inception of the project we have ever been an advocate of the construction of this gateway for the traffic of the city, having always contended for its importance and necessity. It is true it has had many conflicting interests to contend with, internal and external, and great efforts, and a very large amount of means has been expended to crush it out of existence.

There has been no period in the history of the railroad interests of Cincinnati when its construction would not have materially added to her commercial facilities as well as afford extended means of developing our local suburban traffic, so much needed to deplete our overcrowded dormitories.

It is perhaps useless to detail the history of the misfortunes that overtook the enterprise, at a period when everything brilliant had been promised, or to allude to the apathy and inertia that has since pervaded it, until it has been almost forgotten, or alluded to only as a chimerical project of a few madmen, or enthusiasts.

Of its necessity and importance, there is but one opinion; except on the part of a few, interested in rival interests. With the increase of years, and the population and wealth of the city, its importance and necessity has increased in geometrical progression, until its construction much longer delayed would be almost suicidal to the interests of the city, and especially of the east end.

Taking this view of it, we are not astonished to witness the wonderful "awakening"

of interest that has recently taken place in reference to this old and long dormant and neglected but important enterprise.

It had been buried for so many years under an incubus of legal troubles, apparently as deep and unfathomable as the debris of Hericulanum and Pompeii, that even *hope* of a resurrection had almost died out. The lawyers had been gloating over it, and growing fat on the picking of its bones until its skeleton had become as dry as those in the valley as seen by Ezekiel. The lawyers were beaten, and there was a shaking and a coming together of the parts, and a sound as of preparation for life, vigor, existence. Form, shape, and semblance had been given to it. But it was worthy of one more struggle on the part of the lawyers, who have no fear of God, ghost or man, if they can only make anything; so the effort is to be made to seize these gathered bones and sell them to the New Jerusalem Fertilizer Company to be ground into impalpable powder, and the interests of the city to be disregarded,—a much needed public improvement again suspended and sacrificed for supposed conflicting interests.

Can it, or will it, be done? We think not!

This question comes up for a hearing to-day (Thursday) before Judge Hagans, when we trust that the Court will allow the winds to blow, and breathe upon it, that it may live, and render good service to this community.

Now we would remark to the legal gentlemen, they may just as well

"Hang up the fiddle and the bow,"

And allow this work to go on, which, if it had not been interfered with since the decree of court clearing it of legal disabilities, would have shown by this time very commendable progress.

It would, perhaps, be imprudent and improper to say, that it matters but little what the decision of the court may be, the work is going to be constructed!! We would not, and do not say it, as in contempt of the action of court; but we do say, that the necessities of our city will not "longer brook delay," and will force this work to completion. Public sentiment has fully set in this direction; interest and sympathy are alike awakened, and the work must and will go on.

The contract has been made for its construction, signed, sealed and delivered,—ratified. Engineers have already been looking over the ground to see the condition and necessities,—the parties contracting are able, understand their business—the money is waiting, and the whole work is to be finished without throwing a single security on the market.

The result will be that the best avenue to the outside of Cincinnati will be opened up, the hills beyond the summit will be covered with happy homes,—mechanics, merchants and manufacturers, can step into the cars, almost in the heart of the city and in half the time required to reach their homes now by

the ordinary street cars, they will step into their comfortable residences, free from city noise, dirt and malaria. It is a well known fact that this road crosses, in coming into the city not a single street or avenue—rapid time can be made direct into the depot; a distance of two miles on this line will take you as far from business center as seven or eight by the other lines—and will be a saving not only of the actual distance run, but also by the rapidity with which trains can move, an immense saving of time. This much for local traffic.

Through traffic will be indebted to it fully as much. It is useless to discuss whether the other lines will use it or not. The truth is, they have got to use it, and they can not help themselves. Five or six miles of distance saved, and the ability to run at full speed, are arguments that railroad men comprehend, and they will not fail to avail themselves of them.

Chesapeake & Ohio Railroad.

Quietly and silently this great work is progressing and moving forward towards the Ohio river. The shortest living line between Cincinnati and tide-water and the South-eastern trade. Has Cincinnati no interest in its construction?

Louisville has already seen to it, and got the "traps set" for the shortest and best line that can be made between the mouth of Sandy and that city, to direct the traffic of the West and South-west over her lines, and through their city. In this arrangement, she has, of course, not consulted what would be the interest of Cincinnati, but pushed that line that would be equally short, but as far away from Cincinnati as possible—via Lexington. With this we have no fault to find, no complaint to utter. We merely state it as a fact, to which it is fully to close our eyes.

The question that revolves itself is, will Cincinnati have any connection with the Chesapeake & Ohio Railroad at all? If so, how, and by what means?

The honest indications are that she will not, if it depends on Cincinnati to do anything, very special, towards it.

It is true that there has been several series of resolutions passed by the various public bodies, and several preliminary surveys have been run over different competing lines and paid for by the parties interested. Yet there is a lack of that organized effort and determination that is indicative of good faith and a purpose to construct a great and much needed work.

All will admit its importance. Nobody will deny it. Yet there appears to be no leader who can direct, organize and consummate works of this character in the interest of Cincinnati.

The Hillsboro line has exhibited the largest amount of vitality. Col. Trimble, a gentleman of means, intelligence and energy, who has a large landed interest on the route proposed

has been pushing it. If he had not, it would have been equally dead with the others. But even the condition of this is very problematical. It is a matter of great doubt if with all his energy and interest he can vitalize it; although he apparently possesses the confidence and friendship of the managers of the Chesapeake & Ohio line.

It may be that he will succeed and construct a portion of his line east of Hillsboro, (his home) and then with the aid of Dayton and the people in that direction secure a road, connected at one end with the Chesapeake & Ohio, and the other with a Chicago tendency. This we think he can do, with less trouble than he can reach Cincinnati.

This will be very nearly what the Chesapeake & Ohio want,—a direct connection with Chicago—enabling them to compete for the great grain traffic of that city, and in which they would have an enormous advantage, with their low grades and short line to tide-water, over the other lines. In this the Chesapeake & Ohio will no doubt willingly aid Col Trimble, as they have already done, so liberally the Lexington & Big Sandy, by subscribing two millions to its stock, for the South-western traffic.

Having thus secured the traffic of the South-west, via the Lexington & Big Sandy, through Lexington and Louisville, and of the North-west through Hillsboro, Dayton, etc., what interest will they have in reaching out their arms to Cincinnati? Their great object will have been accomplished, and there would be nothing left to contend for but our local trade.

This it is true would be of value; but will they not look upon it as of as much value to us as them, and require us to pay for it? It would be contrary to the usual custom if they did not!

We feel warranted in saying that we have no faith that the Chesapeake & Ohio Railroad will contribute to any great extent to secure a Cincinnati connection. Whether it is of sufficient importance to secure it for ourselves, we leave for our men of wealth to determine!

UNION DEPOT, MEMPHIS.—The City Council of Memphis agreed on Wednesday to grant the privilege for a union depot for all the railroads, and one for freight in front of the lower steamboat landing, and one for passengers in front of the upper landing. The measure is generally approved.

—The Iowa Narrow Gauge Railway Company, incorporated on the 21st ult., has its office in Marshalltown, and organized capital of \$2,000,000, and proposes to construct three roads from Marshalltown: one north-west to Webster city, 60 miles; one south-west to Des Moines, 55 miles; and one south-west to Waterloo, 50 miles.

—The change of gauge of the Ohio & Mississippi Railroad, from 6 feet to 4 feet 8½ inches, was made on the North Vernon & Jeffersonville branch on the 16th inst., and will be made on the main line, between St. Louis and Cincinnati, on the 23d inst.

Railroad Monopoly.

The Pennsylvania Central Railroad has leased, for a term of 99 years, the Indianapolis & Jeffersonville and the Jeffersonville & Madison Railroads, thus giving them the monopoly of the routes leading to the great bridge at Louisville. Its next step will probably be to get control of the Louisville & Nashville Railroad. —*Kentucky Yeoman.*

There is another thing the *Yeoman* might also have told us, and that is, that this gives the Pennsylvania road the controlling interest in the stock of the railroad bridge at Louisville. It will, therefore, control not only the routes but the bridges both at Cincinnati and Louisville, and hence is supposed to have the control of Southern traffic.

When this arrangement shall have been consummated there will be very few lines now constructed in Kentucky, certainly none of any prominence or value, that will not be under the control of the great Pennsylvania line. What the result will be in reference to Kentucky legislation we are not prepared to say. Certain it is that we have no reason to suppose it will, so far as the power of the railroad is concerned, be any more favorable to granting the right to construct the Cincinnati Southern Railway than it has been heretofore.

Central Kentucky has been robbed of this franchise by the L. & N. Railroad monopoly—every side and cross road in the State aided by their influence to do it; either for the purpose of sustaining the power of this monopoly, or of exacting forced contributions from Cincinnati and those interested in the construction of the Cincinnati Southern Railway. Will this be any better if the Pennsylvania Railroad gets the entire control of the L. & N.?

It has had its hand on the throat of the L. & N. for some time and everybody knows it. Yet the Pennsylvania indignantly and virtuously denied having anything to do with the opposition to the Cincinnati Southern Railway bill!

By the way, what will become of "eminent domain," and Judge Phister's "Trojan horse" if this should take place? It seems to us that "eminent domain" will have "departed," and the gallant steed will be turned out to die, being spavined, sweetened, ring-boned, poll-eviled, pharsied, troubled with the gravel, botts, and rheumatism, and wholly unable to stand up to the "rack." The Legislature last winter, blowed the "Trojan horse," broke his wind, and foundered him by passing the St. Louis & Iron Mountain Railroad charter, containing all the purported objectionable features of the Cincinnati measure, whereby this line acquired and became "entitled to all the privileges, rights and immunities, and be subject to all such restrictions as are granted, made, and prescribed for the benefit, government, and direction of such company by the act of their incorporation," passed by the Legislature of Missouri,

and approved March 3d, 1851. That, too, without having even a copy of the charter to look at and see what it was. But then it was not a competing line with the L. & N.; and hence, did not meet with its disapprobation. Besides, Missouri was not an abolition State, and had nothing to do with "stealing their niggers!"

Can any measure be passed hereafter that has not already been legislated upon in Philadelphia? Alas! for the "principle" involved! We shall see what we shall see!—*Gaz.*

Southern Ohio Railroad.

In answer to the numerous inquiries by letter and otherwise, as to the condition of affairs of the Southern Ohio Railroad, I wish to say that the map, profiles and estimates have been completed, and the report of the engineer and my own statement of the character and claims of the line forwarded to the president of the Ch. & O. Co. The map and profiles await his order.

I expect also, with my chief engineer, to accompany the chief engineer of the Ch. & O. Co. over the line, about the last of this or the 1st of next month.

If the surveys of the competing lines south were ready for submission to the president and directors of the Chesapeake Co., a decision might be anticipated at an early day. It seems to be recognized by all that no line can be built in southern Ohio without aid from that company.

What that decision will be, I can not say. I think I am justified in saying that the line I have been instrumental in presenting is the true line for the Ch. & O. Co. and for the country, and ought to win. The reasons for this opinion, and the report of the engineer, will be presented to the people on the line when appeal is made for stock to aid in building the road.

WM. H. TRIMBLE,
Pres't Board of Corporators.

WHAT IS A RAILWAY CONNECTION?—The following are the grounds on which the Supreme Court of Maine, in the injunction case between the Boston & Maine and the Portland, Saco & Portsmouth Railway Companies, sustained the injunction until a final hearing and decision of the case: In the charter of the Portland, Saco & Portsmouth Railway Company the legislature reserved the right to authorize other roads to connect with its road; and afterwards authorized the Boston & Maine Railway to connect with it. The case turned upon the meaning of the term connect, and the court held unanimously that it means not only a physical connection but a business connection, so as practically to make one road of the two thus connecting. Question was also made whether the court has jurisdiction, the statute having authorized the railroad commissioners to fix times and terms in such cases. But the court held that it has jurisdiction in this case, because the respondents claimed that the statute requiring them to draw the cars of a connecting road was unconstitutional in respect to them, and denied the right of the Boston & Maine company to have their cars thus drawn, and because the remedy through the railroad commissioners would be so slow as to be entirely inadequate, and in the meantime the rights of the public as well as of the other complainants would be most injuriously affected.

Railroads and Investors.

Judge Blatchford's decision on Wednesday in the Erie case seems to have evoked approving comment from all parties. The foreign owners of the 60,000 shares in dispute are gratified that the whole of their stock is ordered to be placed in a negotiable form in the hands of the receiver of the court; and their opponents are content to be allowed to register the 30,000 new shares, notice of the issue of which has recently been given to the Stock Exchange from the Farmers' Loan and Trust Company, by whom the transfer books of the Erie are kept. When the history of the complicated litigation of this corporation comes to be written, it is boldly declared that many of the deeper causes of the scandals of the past four years will prove to have been overlooked, and that various parties are implicated who have so far succeeded in escaping public opprobrium, though they have forced on others the responsibility and the odium of grave irregularities. How much truth there may be in these suggestions, we must leave it to the future to decide. One thing is certain. Almost the only excuse popularly made for the present managers of the Erie road is that they have prevented that great corporation from falling into the hands of the powerful monopoly which has already got control of the other direct avenues of commerce between this city and the great West. Of course this plea does not excuse a want of integrity on the part of anybody, and it is never permissible to do evil that good may come. Besides there were abundant means to prevent by more legitimate action the absorbing of the Erie corporation by the Vanderbilt clique. Such, however, is the general opposition to monopolies, and so strong the antagonism to their extension, that much of that popular acquiescence in the doings of the Erie managers which has so puzzled foreigners is thus explained, and especially as those managers are said to have improved the accommodations of their road, and to have greatly added to the facilities of freight and passenger travel.

This same violent opposition of the popular mind to clique ownership of railroads is exhibiting itself every day in various forms in Wall street. To it is due the fact that so few roads are regarded as offering safe investments in their stock. Three or four years ago there was an increasing number of our leading railroads in the East and West, the shares of which were very largely held by investors. But scrip dividends, cornering operations, and various other maneuvers of speculative capitalists, have checked this movement. The public prefer good railroad bonds to doubtful railroad shares, and now, as an inevitable result, our railroads have passed almost wholly into the control of powerful combinations of capitalists, who are moved by considerations of private interest rather than public advantage, and who regard their several roads as a speculative property, to be manipulated at the Stock Exchange rather than as a grave public trust, confided to them by their fellow citizens for the promotion of great national objects. We are in a transition period of railroad development. The evils we refer to will bring their own cure. What is wanted is more rigid responsibility on the part of directors and managers of railroad property. These men must be made amenable to an enlightened public opinion. If they betray their trust, punishment must be provided. At an earlier period this was not needed. Before the war railroad building was often discouraged and impoverished its votaries. And the abso-

lute need of communication was so imperative that the construction of railroads was thrown freely open to the public. The vast growth of commerce, and wealth, and population during the last ten years has destroyed the safeguard of competition by making it the interest of shrewd capitalists to manipulate the traffic and the revenues of certain roads with a view to raise the speculative value of the shares at the Stock Exchange. The relations of these roads to the local traffic, and the reciprocal dependence of railroads for prosperity on the growth of the districts they traversed, was liable at any time to be recklessly sacrificed to some through traffic arrangement, or some Wall street speculative operation. Hence have arisen colossal associations to consolidate various companies, and these have grown till a dozen large corporations threaten to control the whole internal commerce of this country. Will these threats be fulfilled? Of course they can not be carried out in opposition to the will of the people. For these corporations are the creatures of legislation. Almost every other nation besides the United States has asserted more or less explicitly the paramount rights of the government over its railroads. On the Continent of Europe many of the roads will in course of years lapse into the ownership of the government, and pay a revenue to the national treasury. Of course we do not recommend that such a policy of government ownership should be adopted here. It is not quite in accordance with certain fundamental principles of government, and is otherwise inadmissible. But its discussion may serve to show that the concessions entrusted to railroad companies for the public good, confer on the managers of these roads no power to fill their own pockets by robbing the people, and that the rights of boards of directors are shut in by very narrow bounds and sharply defined limits.

The answer to the demand for a remedy is therefore not far to seek. There are numerous indications that we are approaching a new state of things, and that the evil is working out its own cure. First, investors are losing confidence in clique railroads. The public is withdrawing capital from railroad shares and putting it into good railroad bonds instead. If the fuel fails the fire will soon die out. Speculation can not live without the capital of outside investors. It is notorious that the schemes of the cliques have for two years and more brought disaster oftener than profit. Under these circumstances they can not long hang together and their dispersion is a mere question of time. Another lively opponent of these clique movements is the projection of new competing lines of road. As one of the numerous illustrations of this we may mention the proposed short railroad to Chicago. It is suggested by the opponents of the Vanderbilt monopoly. It proposes to shorten the time between Chicago and New York to twenty hours, to tap the largest anthracite coal region in Pennsylvania, to place Pittsburgh 36 miles nearer to New York; Cleveland, 120 miles; St. Louis, 77 miles; and Chicago 96 miles. It promises to take grain from Chicago to tide water at four-fifths the present cost, and to be ready for operation by 1875. Such propositions are both a consequence and a remedy of the evil we are discussing. Without the vast combination of capitalists to which the railroad public have been familiarized in the past few years such large enterprises could not be attempted; and in presence of such enterprises ever waiting to be realized, mischievous monopolies can

not long fetter the movements or oppose the beneficent mission of railroad progress.—*Fin. Chronicle.*

Poor's Railroad Manual for 1871-2.

This unique and most valuable work makes its annual appearance enlarged to keep pace with the growth of the gigantic system which it describes.

At the beginning of the present year 53,145 miles of railway lines were in operation. The increase in 1870 was unprecedented; 6,145 miles of new railroad having been constructed; whereas in 1869 only about 3,500 were made.

The total earnings of these roads in 1870 amounted to \$450,000,000, from 125,000,000 tons of freight, valued at more than \$10,000,000,000.

These roads have cost nearly \$2,500,000,000, representing the day labor of the entire male population of the nation for an entire year. In fact the Manual shows that there is one mile of railway track for every 723 inhabitants, and if their gross annual earnings could be equally distributed, each man, woman and child in the United States would receive nearly twelve dollars; this sum representing the carriage of 3½ tons of freight, worth \$282.

Our sketch (next week) of the old style of toting food and merchandise in old times, taken from "The Railways of Canada," contrasted with this aspect of modern transportation, may well strike the imagination with wonder. It unveils a panorama of the working world. It shows comings of a strange future.

When will the chronic famine in Egypt, Persia, India, cease? When there are published at Cairo, at Teheran, at Cabul, at Madras, such Manuals as this. Over a common road a ton of maize or wheat costs 20 cents a mile; over a railway 1½ cents a mile. What is the consequence? Maize can be moved only 125, and wheat 250 miles from the place where it is grown, by common roads. By railway, maize can go 1,600 and wheat 3,200 miles to market. Minnesota at the center of this continent may feed its entire population. Famine drops from the list of the world's plagues; and with it pestilence. And the same railway system which feeds all, teaches all, unites all, and keeps all at peace. Wars must cease when the railway system is complete.

Will it ever be? Surely it grows fast enough to give us hope of it. In 1851 there was but 8,876 miles of it in operation. In twenty years the increase has been 550 per cent. The entire railroad freight tonnage trebled itself in the last ten years between 1860 and 1870. The population of the United States increases at the rate of 2½ per cent. per annum. Mr. Poor estimates the rate of increase of the productive power of the population at four times the increase of the population itself; that is, the living wealth of the country doubles itself every ten years, through its improved and enlarged machinery, of which the railway system is a chief item, lying at the base of all.

What is a national debt of \$3,000,000,000 to such a nation? As the *New York Times* well says, revenue must increase with wealth, if taxation remains stationary, and taxation must decline as revenue is increased; for a million more tax payers are added to the list every year, and the policy of paying off the nation's debt becomes at the same time easier and more a matter of habit with the public mind, which, with our system of free institu-

tions, regards it, not as a political problem, but as a mere matter of commercial business.

Massachusetts has one mile of track to every five square miles of land. Were all the States and Territories thus furnished, there would be 600,000 miles of railway in running order. Allowing one-half the area of the Union to be uninhabitable, the remainder still demands 300,000 miles of railway, of which only one-sixth are constructed now. But Massachusetts continues to lay down new tracks. Where is it to stop? What mighty combinations are in store in the future for the Railway World? The Pennsylvania Railroad combines under its absolute control over 3,300 miles of line, costing \$250,000,000, and earning annually \$50,000,000—combines with these other thousands of miles which it indirectly controls. What foresight can predict the state of things in ten, twenty or thirty years from now? Timid minds stand awestruck and cower before the spectacle, dreading they know not what, because they do not see the heart blood of the nation pulsating through these iron arteries and veins. A healthy life always takes care of itself. A nation like ours is as self-regulating, self-renovating a machine as any individual body of the organic world; cures its own distempers by instinct; and applies all its faculties with unerring wisdom for its own good.—*U. S. Railroad Register.*

Gen. Rosecrans has contributed to the *Alta California*, the following respecting narrow gauge railroads:

"Regarded economically the railroad is a hauling machine. Every unnecessary expense put upon this machine adds to the cost of hauling done by it. Every unnecessary cost in the construction and equipment of railroads is a public evil. It matters not whether this cost results from blunders in engineering, blunders in management, or frascality in operating the road, or watering the stock, the people have to pay the interest on it. In this view why should we pay for building a broad gauge when a narrow gauge will do all the work likely to be required. Evidently it would be a public wrong for the owners of a railway franchise to build a broad gauge when a narrow gauge will do the work, and the public have a right to see that it is done, and to hold those who thus prepare needless burdens responsible for it. The question comes up, therefore, with every new railway line, and should be asked by the people, Will a narrow gauge do the work? The data for the answer are to be sought in reason and experience; but I will ask the most crowded four foot eight and a half inch gauge railway in the United States more work than it can do? If that line of road with this gauge, which has the greatest traffic in the world, does less than it can, and yet carries five times as much freight over each mile as does the most heavily worked road in the United States, why does the latter need so much more capacity than it has work? If the heaviest worked road in our country has ten times as much to do as the average of roads in new countries can expect to have in twenty years to come, why should they be made to cost so much? Why should our new roads be constructed with a carrying capacity fifty times greater than the work they will be called upon to do? Any man who can show that they ought to be so constructed, can prove that one ought to get a six horse Concord coach to give a baby an airing.

W. S. ROSECRANS.

—There is a movement on foot to build a narrow gauge road from Media to Chester, in Delaware county, Pennsylvania.

The Railroad Progress of a Year.

The fourth volume of the "Manual of the Railroads of the United States for 1871-2," compiled by Mr. Henry V. Poor, a copy of which has just come to hand, possesses a peculiar interest in view of the rapid progress of railroad construction during the past year, and almost as rapid increase of traffic and earnings in all departments of transportation by rail.

According to the mileage table prepared by Mr. Poor, there were, at the close of 1830, 23 miles of railroad in operation in the United States. Between 1830 and 1840 the number of miles of railroad built was 3,515, making, at the beginning of 1841, a total of 3,538 miles. Between 1840 and 1850 the number of miles added was 5,508; and the addition in the ten years ending with 1860 were 21,614 miles. Between 1860 and 1870, 22,764 miles were added, making at the beginning of the current year a total of 53,399 miles in operation.

The greatest progress made in any one year was in 1870, during which 6,145 miles were opened. From 1861 to 1866 the progress of construction was very much delayed by the war and the disturbed condition of business generally, only 3,273 miles having been constructed during the four years of its continuance, or 2,872 miles less than were opened in 1870 alone. With reference to future progress, Mr. Poor wisely refrains from venturing any definite estimates. He thinks, however, that the system is likely to extend very rapidly for several years to come. The progress made will depend largely upon the increase of population, but as a given number of inhabitants double their traffic every ten years, it is safe to predict that railroads will continue to increase very rapidly for some time to come, even in those States which can not show a very large percentage of annual increase of population. The State of Massachusetts has one mile of railroad to every 5.27 square miles of territory.

A similar ratio would give New York and Pennsylvania about 9,000 miles respectively, or more than double their present mileage, while it would give to Illinois about 11,600 miles, or two and a half times its mileage at the beginning of the current year. In these three States it is probable that the mileage will increase rapidly until the Massachusetts ratio is reached, but in most States it is doubtful if the increase of population will be sufficient for several years to justify any such increase of railroad facilities as would be needed to give a rate of mileage to territory equal to that of Massachusetts.

The increase in the volume and value of the tonnage traffic of our railroad system is even more remarkable than the increase in mileage. In 1851, the tonnage of the railroads then in operation amounted to about five million tons. In 1870 the net tonnage, deducting about 30,000,000 tons for freight passing over more than one road, and more than once counted in the gross total, amounted to 72,500,000 tons. The earnings of the 50,000 miles of road in operation last year are estimated at \$450,000,000.—*New York Bulletin*

INSPECTION OF THE BOTTOMS OF WELLS.—Sufficient light to enable any one to see the water or earth at the bottom of a well, can be directed down a shaft by means of an ordinary looking glass. If the well be under cover, two glasses will be required, and our own ingenious readers will, by a little experimenting, be able to arrange them in the right positions.

The Viaduct Railroad and East River Bridge.

At the last meeting of the Directors of the Viaduct Railroad Company, the President, Judge Hilton, stated that several corps of surveyors were actively engaged in making surveys of the proposed route, and that he had expected that the committee appointed at the meeting of a few merchants and capitalists in the rooms of the Chamber of Commerce would have been present to advocate the extending of the road below Chambers street: some advocating that it ought not to end short of the Battery. The Committee, however, did not appear. The survey, it is said, will be very carefully made; one hundred and fifty engineers are engaged on it. As soon as the survey is completed, a report will be made to a committee consisting of Gov. Hoffman, Mayor Hall, and Commissioner Tweed, of the Department of Public Works. The contemplated road is to run about twenty-five feet above the ground, on brick arches, between transverse iron ribs, supported by heavy iron lateral columns artistically designed, themselves supported on inverted arches of solid masonry built into the ground. All available spaces under the road will be converted into stores and markets.

The viaduct forming the "approach" to the East River Bridge, from the depot at the City Hall Park to the anchor wall, will be 1,336 feet long, and 85 feet wide. To avoid danger from fire in buildings below, it is proposed to buy the ground needful for a wide avenue in the line of the bridge, from Chatham street to the river. On this, fire proof warehouses must, it is thought, be built, so as to make their framework in part of the viaduct supports. The cost of this will be immense, and the remark made at a meeting in the Chamber of Commerce rooms (already referred to), that Brooklyn, unaided, can not build the bridge, becomes intelligible. The Bridge Company do not seem disposed to grapple with this question yet. \$20,000,000 to \$25,000,000 is the estimate of prominent business men of the total cost of this work; and its managers begin to view favorably the consolidation of the two cities, that the expense may be shared between them.

PAPER UNDER-CLOTHES AND SPREADS.—The Japanese paper handkerchiefs are assuredly coming, if a contemporary be right. The paper collar manufacture has been extended to less prominent but more important garments of great strength and flexibility, which can be sewed with a machine, giving seams almost as strong as a woven fabric. The inventor has particularly applied it to the production of petticoats, which are either printed in imitation of the fashionable skirts of the day, or stamped out in open work of such beauty and delicacy as no amount of labor with scissors and needle could imitate. The marvel is that these really beautiful productions can be sold at retail at fifteen cents each.

Imitation cretonnes and chintz for bed furniture are also made, a set costing at retail about \$1.50. The felted material is so flexible that a curtain may be twisted into a rope and shaken out again, showing as little creasing as chintz similarly treated. There are also table cloths embossed with designs of great beauty. This felted paper may in the end have a serious influence on the production of the woven fabrics it is intended to displace. Imitation leather, impermeable to water, is likewise made of it, and produces a cheap and useful covering for furniture, and even serves for shoes.—*Paper Trade Reporter.*

The Borax of Nevada.

Several months since we announced the discovery of extensive deposits of borates of lime and soda in California and Nevada, east of the Sierra Nevada, on plains or flats which are covered by water in wet seasons. We can add now that the expectation then entertained of an extensive and profitable production of borax have been strengthened by the brief experience since acquired. The borax deposits of California are farther from the market, as well as inferior in richness and extent, to those of Nevada, and the latter will probably furnish a large part of the borax of commerce in the course of a few years.

The borax consumption of the world is about 11,000 tons annually. The present price in Europe is about \$300 per ton, making an annual value of \$3,300,000. In the United States it is sold by retail at the rate of about \$500 per ton. It is said that the Nevada borax can be furnished with a large profit at the rate of \$150 per ton, or one half of the present price in Europe.

The known borax deposits of Nevada, supposed to be valuable, have been "located" by individuals who have in some cases sold out to companies. The Nevada Consolidated Company, of this city, claims the best of these borax locations, covering an area of 20,000 acres at Columbus, Fish and Teal Flats or Lakes in Esmeraldo county, Nevada, 140 miles south west from the Central Pacific Railroad. This company brought twenty-one tons of crude borax to this city some weeks since and refined it here, obtaining ten tons of the pure borax, which is beautiful in the form, color and size of its crystals; and in strength, according to the statement of some blacksmiths who have tried it, it is superior to the best English borax. The company are now negotiating with a party of Englishmen for a sale of one-half the property for \$500,000, and they say that if the sale is not completed within a few weeks they will put up extensive reduction works at Wadsworth and commence the work of refining.

The crude mineral consists of borate of lime and borate of soda, mixed with sand, mud, carbonate of soda, chloride of soda, and magnesia. It is supposed that warm springs of boracic acid rise in these flats or lakes and that the acid uniting with the lime of the country rock, or with soda found in the flats, forms the borates. At some points the water is so hot five feet beneath the surface that a man could not stand in it. In dry seasons the water is found from one foot to five feet below the surface. About a hundred tons of crude material can be obtained from an acre in the best places, and in the course of a few months it is replaced, so that the supply seems inexhaustible. Columbus flat has borate of lime and chloride of soda. Teal flat has borates of lime and soda. Teal flat is eighteen miles east and Fish flat is ten miles south of Columbus.

The borate of lime is insoluble in cold water, and the crude material is ground fine and then washed, the water dissolving the soluble impurities. It is then dissolved in hot water which leaves the sand behind it. Soda is added, and the boracic acid abandons the lime to unite with the soda in borax, which is then crystallized. A second crystallization is used to get the handsomest and purest borax. By another process sulphuric acid is poured into the hot solution of borate of lime, the result being the formation of sulphate of lime, which falls as an insoluble precipitate, while the boracic acid is left free; and when

drawn off soda is added to make the needed biphosphate of soda, the borax of commerce. The cost of reduction is estimated to be \$50 per ton of refined borax at the utmost. Borax contains a large percentage of water, and one ton of pure borate of lime has enough boracic acid to make nearly two tons of borax.

Several companies are preparing to produce borax. At a borax flat of 1,280 acres, about forty miles south of Wadsworth, on the Columbus road, claimed by Troop and others, a large boiler has been erected for refining purposes. The crude material is thrown into water nearly boiling hot until saturation is reached, and is drawn off into a vat where the borate of lime crystallizes, with some impurities. It is taken out, washed with cold water, put into the boiler, and dissolved to saturation in water at a temperature of 133 degrees, the hygrometer standing at 21 degrees. Crystallization is then effected again, and merchantable borax is obtained. This account of the process is given to us by a correspondent, and seems to imply that the crude material is a biphosphate of soda, needing only to be freed from impurities and formed into large crystals for commercial purposes. The probability is, however, that the account is not exact, and that other processes are used in addition. We think there is no mistake about the high value of the borax deposits.—*Alta California.*

The London *Quarterly Journal of Science* says that a considerable number of gentlemen lately met at the Lancashire engineering and compression casting works of St. Helen's Junction, to witness the new process of casting in brass and iron, chased and embossed work of the most elaborate description. The process, which was then for the first time exhibited in England, is an American invention, and its utility was shown to consist in this: That any design, whether in high or low relief, chased on metal of any required pattern or shape, whether flat as a door-plate or round as a vase, can be reproduced by casting *ad infinitum*, and each casting will show upon it all the sharpness of the original casting. Molds are made with a preparation of fine clay. The making of one of these molds takes from five to ten minutes. They have then to stand twenty-four hours exposed to dry air, after which they are baked in a furnace for eight hours. These clay molds, into which the metal is afterwards poured, are, to all intents and purposes, encaustic tiles. The molds are placed in a box, and the air is extracted from them so as to form a vacuum, after which the molten metal is forced into them, and in this way, in ten minutes, a casting can be completed. When the casting is taken out, the design, however intricate, is found to be perfectly represented, with the exception of removing a slight surface of clay from it, which can be done in half an hour, and the article is then ready to be sent to the bronzer, instead of having to be put in the chaser's hands. In this way an enormous amount of cost and labor on ornamental articles in metal is saved.

—The Missouri, Kansas & Texas road has been finished to Pryor creek, a point 35 miles north of Fort Gibson, and within 200 miles of the Texas line.

—Of the 80,000 shares of \$50 each, of the Cincinnati & Terre Haute Narrow Gauge Railroad stock, 5,710 shares have been taken. The capital stock is \$4,000,000.

Molded and Pressed Glass.

Flint glass, or crystal, forms one of the most beautiful varieties of this beautiful material, and in its manufacture into the various objects employed, both for ornament and use, many ingenious methods are employed. Molded flint glass may be considered one of the most important improvements in the modern treatment of this substance. Its refractive and cut like effects are so similar to those obtained, at a much greater cost, by cutting the glass, that it is not always easy to determine whether it is really cut or not.

The peculiarity of modern molded glass is, that the interior of the article has no indentations corresponding to the figure outside, and its luster is consequently due to the inequalities of its substance. The metal is first gathered on a rod in the ordinary way, allowed to cool a little; some more is then taken up, and the mass is immediately pressed into a metal mold, on the interior of which the figure to be impressed on the glass is indented. In this way the exterior coating only fills the indentations, the cavity in the interior preserving its smooth and circular form. When about half formed, the projecting parts are made slightly to separate from each other by quickly turning the rod, while the workman at the same time blows into it. The article is then brought as usual into the desired shape, and in order to give it a polish, it is exposed to heat just sufficient slightly to melt its external surface, which is called the fire-polish, and is then annealed.

What is called pressed glass is a variety of this last kind, and the operation of its production is quite simple. A die and mold of the desired shape are secured on a table; the die is capable of being plunged into a mold by a lever, thus forcing down the glass before it, and causing it to assume the shape of the mold. It requires much practice to collect the exact quantity of fused glass necessary, and if this be not the case the article is spoiled. It is an extremely rapid and cheap mode of producing glass objects. The effect, however, is not so good as the last, and this method is chiefly confined to very common objects.

Another variety of pressed glass manufacture is what is called drop-pushing, and is employed chiefly for making the drop work and spangles for chandeliers, &c. Lumps of glass are made expressly for this process, and are softened in a blast furnace. When sufficiently soft they are then squeezed in pairs of hot dies, and the required form is thus given to them. They also require to be cut and polished in the same way as ordinary cut glass.

GRAND RAPIDS & INDIANA RAILWAY—ELECTION OF DIRECTORS.—The stockholders of the Grand Rapids & Indiana Railroad met at Sturgis, Michigan, on the 19th inst, for the election of a board of directors for the ensuing year. There was a large attendance. The following gentlemen were chosen: Joseph K. Edgerton, Pliny Hoagland, Frank P. Randall, J. N. McCullough, Thos. D. Messler, Springer Harbough, M. Talcott, Andrew Ellison, Wm. A. Howard, Harvey J. Hallister, George H. White, Byron M. Haucks, and J. G. Waite—thirteen in all, making four more than heretofore.

The party, numbering about fifty, then went north on a special train to the northern terminus of the road, and to where rails are being laid.

The Railroad Sensation of the Year.

A Short Line Railroad From Cincinnati to New York—Plans Matured for Building a Road One Hundred and Twenty Miles Shorter than the Shortest Existing Route.

About three months ago there appeared notices in the papers of the organization of the Kentucky & Great Eastern Railroad, and the election as directors of Colonel S. W. Morton, of New York; A. J. Hodder, of Cincinnati; General J. C. Fremont, of New York; General N. P. Banks, of Massachusetts; Judge William P. Cutler, of Marietta; J. M. Duke, of Maysville, and James T. Brady, of Pittsburgh.

Colonel Morton was elected president of the board, Mr. Hodder, vice-president, and T. Wrightson, secretary.

The ostensible purpose of this organization was to build a road from Covington to Catlettsburg, Kentucky, and it attracted, at the time, comparatively little attention. The developments of the last few days, however, have put an entirely different phase on this project, and reveal the fact that instead of being a local project, it was really a plan for building a road from Cincinnati to New York city. The president of the road reached the city yesterday, and though he is not disposed to reveal all the purposes of the organization, he and those associated with him are willing to let the world have enough light on the subject to enable them to discover a plan for constructing a road from this city to New York, which they claim will be one hundred and twenty miles shorter, by measurement, than the Pennsylvania Central, the shortest existing route.

The company contemplate the construction of the road from Covington to Catlettsburg, a distance of 130 miles. From the latter place they proceed across the State of West Virginia over a route already surveyed, striking near or at the Point of Rocks. From Catlettsburg to Point of Rocks will be 230 miles, making from Cincinnati to the Potomac, a distance of 360 miles. A part of the line will be over the Maysville & Big Sandy Railroad, the franchise and property of which it is said the new organization has purchased. On this part of the road work has been done which is estimated at \$300,000.

Through the State of West Virginia preliminary surveys have been made, though the exact route has not been determined.

From Point of Rocks connections will be made with roads now existing, or constructing, through the State of Pennsylvania, the cities of York and Reading both being points.

By this line the projectors claim the distance from Cincinnati to New York will not exceed 626 miles, and may by contemplated changes be even less than this. The new line will compare with existing roads, according to the figures furnished by the officers of the former, as follows:

	Miles.
New York Central.....	880
Erie.....	861
Baltimore & Ohio.....	777
Pennsylvania Central.....	746
Kentucky & Great Eastern.....	626

If this estimate is correct, and the gentleman vouches for it, the basis of actual surveys, it will be seen that an immense advantage will accrue to the new road. One hundred and twenty miles are equal to four or five hours of travel for passengers, and in both passengers and freight the saving in cost of

so much transportation is a matter of great consequence.

But this is not all that is claimed for the new line, for while the projectors urge that the new route will be 120 miles shorter in measurement, in equating distances by reason of curves and grades, the distance saved, they say, will with the former be little less than two hundred miles.

The grade throughout the entire line is of the most favorable nature. In Kentucky the maximum grade will be fifteen feet. In West Virginia, going east, 52½ feet, coming west, 72 feet. The value of the latter will be better understood when it is remembered the maximum grade of the Baltimore & Ohio road is 117 feet.

Of the benefits of this road, if completed, so far as bringing us coal, iron, salt, lumber and oil are concerned, our readers need hardly be informed. Its consequence is one which could not readily be over-estimated.

The road from Cincinnati to Catlettsburg can be completed within one year, and the projectors say no reason exists why the through line to New York may not be finished within three years.

But this is not all of the project, for it now turns out the same parties who are interested in the road from Cincinnati to New York, are also the moving powers in the proposition to complete the old tunnel under Walnut Hills, of which we have spoken heretofore. That contracts have been made for the finishing of the latter there can be no doubt. It seems, then, that these are all but parts of the same general plan for building up another magnificent railroad interest which will connect Cincinnati with the seaboard, furnish to the new route a safe outlet to the north-west, and what is probably more than all, to prepare a great eastern arm for the Southern Pacific road, the completion of which will not be delayed many years.

In all respects there is more significance about the project than any in the railroad way that has lately found its way to the light.—*Gazette.*

INTERESTING ENGINEERING OPERATIONS IN CHICAGO—It is reported that, after having raised herself several feet out of the mud, Chicago discovers that her river does not run to suit her. The current of the river, which ought to empty into Lake Michigan, was sluggish, and refused to move with the desired alacrity. Efforts were made to quicken its movements, but without avail. The people of Chicago are determined that the sluggishness of the river shall not hinder the progress of their city, and hence have adopted no less radical a way of obviating the difficulty than that of reversing the direction of the stream, and making, as a correspondent aptly expresses it, the mouth of the river the inlet, as in fact it should be.

In order to accomplish this feat, they first erected large pumping engines to raise the waters of the south branch of the river into the Illinois and Michigan Canal, which empties eventually into the Mississippi. This project proved expensive and inadequate, and the proper surveys having been made, we understand that it is proposed to lower the summit level of the canal, so that the water will flow naturally from the Chicago river into the canal, and thence into the Illinois river, which empties finally into the Mississippi. The drainage of Chicago will thus reach the sea through the gulf of Mexico instead of through the Gulf of St. Lawrence. The distance between the mouths of the two gulls is about 2,000 miles.

THE CHARLESTON PHOSPHATES.—Many years ago it was discovered that underlying the soil at the depth of about six feet, for miles around Charleston, was a bed of phosphatic rock. Upon analysis, it proved to be adapted for the manufacture of a superior quality of fertilizer. These phosphates are the bones of extinct animals and fishes. Among them have been recognized the bones of the mammoth, mastodon, megatherium, mylodon, negalox, phocodon, and several varieties of the sauri. Also teeth and bones of horses, dogs, sheep, cattle, hogs, etc. Pieces of pottery, stone hatchets and human bones have also been found in the same deposit. In its crude state, when ground fine it is said to be equal to calcined bone in fertilizing power, as it embodies seven per cent. of organic animal matter containing nitrogen, equivalent to one-half of one per cent ammonia.

Fifteen companies, with an aggregate capital of over \$2,000,000, are now engaged in the manufacture of fertilizer from this material. They grind it fine, mix it with sulphuric acid, which makes it a superphosphate, and to lighten its enriching properties, they effect a chemical change of value by adding a little Peruvian guano. In 1867 there were two shipments, of five tons of this product to Europe, for experimental purposes. In 1868 there were 24 shipments of 30 tons; 1869, 32 shipments, 8,000 tons. Now the companies are shipping at the rate of 1,000 tons a day, mostly to England. One company has a contract to deliver 200,000 tons.

SEWING MACHINES.—The number of these machines made by twelve principal companies during the past year amounted to 320,669, which, at the average of a first-class machine, say \$75, aggregated total, \$24,050,170. The first-class American sewing machine is to be found in all quarters of the world, and the supply comes principally from this city and Boston. There are many cheap machines which are sold all the way from two to twenty dollars, which are not counted in these figures; also many cheap imitations of the best American machines manufactured in England and on the Continent, which are sold as of American make. Germany, in particular, does a very large business of this kind, Hamburg having no less than six large factories running, and finding a market principally in Russia, with which country we have comparatively little trade. Notwithstanding this competition, the machines sent from this country command high prices abroad, on account of excellence in workmanship and finish, and are exported in large numbers annually. All of the largest manufacturers have agencies in the principal cities of Europe, and receive large orders from abroad by nearly every steamer. The largest number made by any one concern in a year was 86,781. Notwithstanding the large amount of work which can be done by these ingenious contrivances, which used to be done entirely by hand, there seems to be no diminution of hand-work in many branches of business. As the cost of manufacturing good machines varies from \$12.50 to \$60, and the price at which they are sold ranges from \$60 to \$350, the profits of the business are enormous.

The leading cities in New York State have the following capital invested in manufacturing: Syracuse, \$11,811,500; Rochester, \$15,000,000; Oswego, \$5,100,000; Utica, \$6,225,000; Auburn, \$5,075,000.

Extinguishing Fires by Carbonic Acid.

It is well known that fires in coal mines have been extinguished by pumping in vast volumes of carbonic acid and afterwards cooling down the adits by water. How far such a method would succeed in the open air and with burning houses is a question that can only be determined by actual experiment. One of the best ways of driving carbonic acid out of caves and wells is to let down a red hot cannon ball. The rarification and expansion produced by the heat soon displaces the carbonic acid, and renders a descent into such a place possible. This experiment, frequently shown in the chemical lecture room, would seem to throw some doubt upon the probable success of any attempt to play a stream of carbonic acid upon a burning building. Another question to be considered is the one of heat of the combustible material. If it were possible to stop the combustion by a stream of gas, the great heat would re-ignite everything the moment the air was allowed free access. unless, as in the case of the coal mine, great volumes of water were poured on to cool every thing down below the point of ignition. If this be true, it would be easier to put the fire out by water in the first place than to be at the expense of double engines for gas and water. Another difficulty may arise in the transportation of carbonic acid through iron tubes. It is well known that this gas can be easily split up or dissociated by passing through a system of heated tubes, and although it is not probable that the same thing would take place with cold iron mains, it might be well to institute an experiment or two before laying down a few hundred miles of pipe. When a fire is put out by water, the intrepid firemen are often deluged with water to cool them and protect them from danger. In the case of carbonic acid, every living being would have to keep at a safe distance, and a bad leakage or an unfortunate aiming of the pipe might produce disastrous consequences.

We understand that at the last session of the Legislature, a law was passed authorizing a company to lay pipes, three feet beneath the level of the streets of New York, for the purpose of extinguishing fires by carbonic acid. It is intended to convey the gas in the same way as illuminating gas is furnished to consumers, from large reservoirs or gasometers, and to have—we can not call them hydrants—but something on the same plan, for attaching hose all over the city, ready to put out any fires that may occur.

Whether private houses are to be furnished with double pipes so as to enable the gas men to deluge them if occasion should require, we are not informed. Nor is anything said in the act of incorporation about furnishing free soda water by saturating the Croton reservoir with the gas. The whole scheme looks suspicious, and we should really like to know if the project has ever been seriously entertained.—*Sci. American.*

A Spider's Engineering.

In 1830, at Newcastle-on-Tyne, England, a gentleman boasted to a friend that he could introduce to him an engineer of more wonderful skill than Robert Stephenson, who had just made himself famous by perfecting the railway locomotive. In fulfillment of the boast, he brought out a glass tumbler containing a little scarlet-colored spider, whose beauty, with its bright yellow nest on a sprig of laurustinus, had induced a young lady to pluck it from the bush where it was growing. When brought

into the house, it was placed on the mantle-piece, and secured by placing a glass over it.

In a very short time, this wonderful little engineer contrived to accomplish the Herculean task of raising the sprig of laurustinus, a weight several hundred times greater than itself, to the upper part of the glass, and attaching it there so firmly that, after forty years, it is still suspended where it was bung by the spider.

In the Bible we read: "The spider layeth hold with her hands, and is in king's palaces;" but in its glass prison there was nothing for it to lay hold of—no peg, or nail, or beam, on which to fasten its threads. Yet, in a short time the little insect had accomplished its task.

It is believed that this kind of spider always deposits its nest upon trees, and never upon the ground; and this may account for its wonderful effort to raise the branch to the upper part of the glass.

It may still be seen, dead and dry, hanging by one of its threads from the top of its prison house, with its little nest upon a leaf of the laurustinus.—*Boston Journal of Chemistry.*

PAINT.—Paint, when properly used, is a source of ornament, but when of inappropriate colors it disfigures rather than adorns the building to which it is applied. By excluding both air and water, paint serves to preserve the timber to which it is applied, and for this purpose the medium in which the paint is mixed is perhaps of quite as much consequence as the paint itself. While lead has long been considered one of the very best of preservatives, while in fact it is one of the very poorest. Compared with lamp-black, it is a very inferior agent in preserving wood, as may be seen by observing the old sign boards at toll gates and toll bridges. Exposure for many years to sunshine and storms will in most cases have removed not only the white paint that covered the wood, but much of the wood itself, while the characters which signify the directions, rates, toll, etc., will be raised above the surface, like the letters used by blind persons in learning to read. The combination of carbon and oil used in painting the letters has remained through all, bidding defiance to the tooth of time himself. Such being the case, we are left free to choose among the colored paints such as will suit our fancy, and correct taste indicates the avoidance of all glaring and obtrusive colors. Hence, except in rare situations, pure white is one of the least desirable colors that we have, although it is perhaps one of the most common. Under some circumstances and especially in the cases in which it was first adopted, such as little cottages nearly hidden with roses and creepers, and peeping, as it were, from behind the trunks of tall trees it looks very pretty, but when transferred to rows of city or village houses, standing in the full glare of the sun, it becomes most painfully offensive.

PRODUCTION OF PIG IRON IN EUROPE.—The probable production of pig iron in the leading countries of Europe in 1872 is thus given: Great Britain, 5,100,000 tons; France, 1,062,000 tons; Germany, 1,907,000 tons; Belgium, 526,000 tons; Austria, 365,000 tons; Sweden, 293,000 tons; Russia, 420,000 tons; and other European countries, 100,000 tons. Assuming that this estimate is approximately realized, the production of pig iron in Europe next year will be about 9,773,000 tons. The actual European production in 1866 was 8,313,000 tons.

What might not be the production of pig iron in the United States if the tariff policy of the country could be made stable and reliable for the next ten or fifteen years?

Glass Blowing.

It is very curious what wonderful transformations take place in the original elements from which glass is made when submitted in a heated state, to the mysteries of the blow pipe. By expert manipulation, and one or two simple tools, glass is manufactured into almost every conceivable shape and form. Animals, birds, ships, vases, bouquets, elaborate toys, and gorgeous flowers are among the wonders emanating from the workshop of the skillful artists in this material. Many curious styles in this manufacture are worthy of careful attention. Of these, the most important are various delicate scientific implements, glass globes, glass eyes, plate glass, etc., etc.

The manufacture of glass is said to have been discovered by the Phœnicians. Pliny describes the circumstances as follows: "A company of Phœnician merchants having landed on the shores of Palestine, near the mouth of the river Belus, were preparing for their repast, and not finding any stones on which to place their pots took some cakes of nitre from their merchandise for that purpose. The nitre being thus submitted to the action of the fire, with the sand on the shore, they together produced transparent streams of an unknown fluid, and such was the origin of glass."

This account is generally denied by chemists, who discredit the possibility of substances of this nature being liquified in the open air. However this may be, it is certain that the royal Egyptian mummies are decorated with necklaces of glass beads, and that the art and mystery of glass manufacture was very perfectly known more than three thousand years ago.

The wonderful Portland vase, so long believed to be made of cameo, is now known to be made of two layers of glass, interwoven with curious figures of singular grace and beauty. It was found near Rome, in the sixteenth century, enclosed in a marble sarcophagus. For two hundred years it was the admiration of visitors at the gallery of the Princess Barberini, at Rome, but was subsequently bought by the Duchess of Portland, for eighteen hundred and seventy-two pounds sterling. From the latter lady it derives the name by which it is at present known.

The most expert workers in glass are the Bohemians and Venetians who manufacture fanciful work of the most exquisite forms. For graceful outline and ornamentation, these people surpass all other nations in this special department. The colored Bohemian glass has a richness and beauty of finish that is not diminished by constant use or lapse of time.

The glass works of Clichy, in France, are among the most celebrated in Europe, and their wares have a reputation in the four quarters of the globe. In many special branches of manufacture, England and France excel other nations. The United States have also made great progress in this beautiful art, and many of our own manufacturers equal the finest productions of Europe, in both plain and decorated work.

Spun glass has been well-known to the inhabitants of the East for many centuries. Glass threads of various colors were woven with silk, and these gorgeous fabrics were worn by the nobility and gentry of a hundred years ago.

The courtiers of Louis the XIV, wore flowing wigs made of this material, and the black and curling locks so nearly resembled the human hair as almost to defy detection. At the *Conservatoire des Arts et Meters*, at Paris, may be seen a lion in glass, of the size of life, with every limb and feature perfect. His hair looks

fresh and life-like. With flashing eyes and bristling mane he is intent on stifling a serpent.

This application of the art is most remarkable. The artist can assimilate the colors of the object to those of the natural skin. The finest production of the loom can also be imitated in the same way. Instead of plaster casts and stuffed birds and beasts, the modern museum can by this means secure an accurate likeness of all objects worthy of preservation, without danger of injury from moths, or the effects of time.—*New York Mercantile Journal.*

SILK.

The silk-worm moth (*Bombyx Mori*) is not very large, has whitish wings, sometimes tinged with gray, and is a heavy looking insect, scarcely using its wings; it is said that being domesticated has probably changed its habits in this respect. The silk-worm moth lays from three hundred to seven hundred eggs in about three days.

Silk was first manufactured in China; and it was forbidden, under pain of death, to export from China the silk-worm's eggs, or to furnish any information as to how silk was manufactured. The manufactured article alone was allowed to be sold.

Silk was unknown to the Romans before Julius Cæsar. He made a wonderful display upon a great show day, at the Coliseum, of the gladiatorial combat, by covering a tent with a magnificent piece of Oriental silk. Although so terribly expensive, as soon as known, great use was made of it all through Europe. Gentlemen wore silk cloaks, and were very lavish in their expenditure and display of the expensive material.

About the year 550 after Christ, two monks who had been in China endeavoring to make converts to their faith, and who while there had closely observed and become familiar with the mysteries of making silk, procured in India the eggs of the silk-worm moth; they hid them in their hollow canes. Two years afterwards they entered Constantinople with their precious treasure.

The larva were fed upon mulberry leaves. The monks gave instruction in the art of raising the worms and manufacturing the silk; and the people were very successful in the whole matter. Plantations of mulberry trees were made all over the Eastern Empire. Southern Greece entered into this new business very largely; and it is said that this was when Ploponnesus lost its old name and was called Morea, from the Latin *morus*, meaning mulberry.

In the beginning of the eighth century, the Arabs introduced the silk-worm into Spain. It was not, however, until after the twelfth century that sericulture, as the manufacture of silk is called, really spread through Europe.

Take this humble little worm out of existence, and what a loss, for purposes of dress, of trimmings, of sewing silk, ribbons, etc., there would be! Think how universally, in every shape, silk is used, and imagine how hard it would be to obtain a substitute.

Efforts have been made to make silk directly, without being obliged to wait for the cocoons (the silk-worm's chrysalis state), by dissecting the worm, observing its silk-producing organs, and taking the matter of which the silk was formed from the body; but it was impossible. Then attempts were made to produce silk directly from the mulberry leaf; but this, too, was a failure. The silk is only, thus far, to be obtained as Dame Nature has provided.—*Oliver Optic's Magazine.*

☞ An inch of rain falling upon an acre of land weighs about 100 tons.

PAPER CLOTHING.—According to French journals, we have discovered a new kind of paper in this country, characterized by unusual flexibility and toughness, admirably adapted for clothing of all kinds. The cost of the material is so cheap that a suit of clothes can be had for one dollar. Besides clothing, we are also credited with the preparation of napkins, table cloths, and pocket handkerchiefs. The voracious Frenchman asks how such clothing will bear the rain, and presumes that it is made water-tight in some way, and thus weather-proof. He also adds that this kind of paper clothing is intended for the poorer classes, and that it is impossible to distinguish it from the genuine cloth.

The author of this information must have taken lessons of the French ministry before publishing it to the world. It is about as correct as the news now served out to the people by the "Provisional Government."

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New Railroads and Old Lines.

PROGRESS OF EVENTS.

I have just passed over 3,000 miles of railroad, and seen and heard something of what is going on. The progress of railroads, even in the oldest States, is wonderful. Three things may be noted: First, what is doing in the old States; next, the competition of the great lines; and lastly, the need of some common government for the railroad corporations.

1. In the oldest States, where railroad work may be supposed to be through with, there is yet new lines continually springing up and likely to be made. Take some examples: In Maine, there is the Portland & Ogdensburg road, on which I passed 55 miles, and which is about this time completed to Conway. The object of this road is to pass through central Vermont and northern New York, with a view to regain the trade of that region for Portland. Another is a continuance of the Eastern road from Portsmouth up through New Hampshire, in the same general direction, and will likewise pass Conway. Again, in Massachusetts is the Hoosac tunnel, which will be a grand work. It is through solid rock, has already cost millions, and will cost millions more. It will be completed in 1872. It was the only way to make a direct line from Boston to Albany, the rocky range of the Hoosac mountains standing directly in the way.

In Connecticut, the Western road is making to connect the Hartford & Erie with the Dutchess & Columbia at Millerton. The ob-

ject of this is to make the road from Boston to Newburg, connecting with the Erie.

In New York, there is the great Midland road, which is to be an interior line from Oswego to New York. With these are several small lines, making in the Eastern States a large aggregate of new lines. Of the Chesapeake & Ohio in Virginia, and the Atlantic & Erie in Ohio, I have spoken before. So, if we were confined only to the old States, we shall find the amount of railroad construction going on to be very large.

2 The competition among the great lines is producing some curious results. First, it is completely demonstrated that the shortest and best lines will take the travel. There are now four great competing trunk lines. In considering the competition among these lines, we must take New York as the center on the east side, for it is no matter whether the person going east has any business or object there or not. It is the point of distribution. If people or goods are to go to Europe, they go to New York as a point of departure. If they are going to New England, it is the same. And even if they are going to Baltimore or Philadelphia, they are almost certain to go on to New York. This is the center, the point of distribution. Now, at or from this point there are four great competing lines. These are, the New York Central, the Erie, the Pennsylvania, and the Baltimore roads. There will be another when the Chesapeake & Ohio is completed. The length of these roads is as follows:

	Miles.
New York Central.....	880
New York & Erie.....	861
Pennsylvania.....	759
Baltimore.....	778

The Central and the Erie make a great circuit to the north, and in the end can not be considered as direct lines from the valley of the Ohio to New York. The Pennsylvania road is now more than 100 miles shorter than either of the northern lines, and has a decided advantage over the other. To tidewater, the Baltimore line is the shortest; but the center is New York, not tidewater; and the high grades of the Baltimore road make it longer than it seems.

If, now, a line be placed on Cincinnati and New York, Harrisburg is on it precisely, and Marietta nearly, and we discover that a straight bee line to New York is less than 500 miles! We see that to go through Pittsburg is also a great and unnecessary circuit. It is 250 miles out of the way, and supposing that 100 miles are lost in the necessary curves of a long railroad, a road ought to be made from Cincinnati to New York, at from 600 to 650 miles, and we have no doubt it can be. Supposing it to be 650, that would be a gain of 110 miles over the Pennsylvania road, and would put the competition of either of the present roads out of the question. Can such a road be made? From the account of the objects of

the Kentucky & Great Eastern, which are given in the *Gazette*, we suppose that this direct line to New York is intended by that company, and if we are correctly informed it will have means enough to accomplish it.

There is also another reason why this road should be made. It passes almost entirely through a country where there are no roads. Eastern Kentucky and West Virginia have almost no development, because capital has heretofore not been applied to develop them. It needs capital to open the mines, cut the timber and make roads, yet it is perfectly obvious that when capital is applied to those sections there will be a great outcome. Whether the immense surplus income of the country is now available for that purpose, time will determine; but it seems to us, from the signs of the times, that these almost unknown regions are now about to be brought to light. In the meantime, however, the old trunk lines are striving hard, not only to compete with one another, but to maintain the vantage ground they have heretofore had. When the Pennsylvania swallowed the Little Miami, it became obvious that the two great northern trunks must either give up all idea of competing for the trade of the Ohio valley, or they must make some new connections. The Erie has done this by its combinations with the Great Western and the Dayton roads; but, owing to the unfortunate litigations, have not yet made their line complete. In the meantime, the New York Central has waked up to the same idea. For a while this great corporation sneered at the idea of coming to Cincinnati, and was satisfied with the trade of the lakes. So far as New York alone was concerned, perhaps this was a correct view. But there are other and greater considerations.

There was the trade of Boston, of Vermont, and of northern New York, which in regard to the trade of the great West, ought and may pass over the New York Central. Then there was the traffic which the Lake Shore line might reasonably expect from the Ohio valley. So, at last, a combination of those interests is now making what is called the "Short Line" road, and which we may see finished at an early day. Thus all the existing trunk lines have come to Cincinnati and will center here. This was an ultimate necessity, and has, perhaps, come as soon as we could expect. This being done, we now see the first steps in the great enterprise of a direct line through West Virginia to New York. We need not go into any details, but only say that we expect to see its completion in less time by far than it took to complete either of the other lines.

3. One other subject I have alluded to heretofore, the common regulation of these roads. The roads can avoid any interference with their business and interests only in one way. This is by always consulting the interests of the public, and attempting no impositions on passengers and merchants merely because

they have the power. They will not have the power long, if they excite the popular feeling against them. There is in the country a wide spread jealousy of the great railroad combinations, not because they are yet injurious, but because the public mind sees that if the whole railroad traffic of the country comes into the hands of four or five great corporations, a combination among them may result, for a time, in a vast imposition on both trade and people. It should be the business of the companies to carefully watch and defer to the public feeling on this subject. If they do not the General Government will interfere with the certainty of sun-rising. The power of the General Government to do this is unquestionable; but its exercise is not desirable, and will not be made unless, as we sometimes see signs of, the companies undertake to make arbitrary power the means of imposition.

E. D. M.

MORROW, July 23, 1871.

What shall we do about it?

A well known and enterprising gentleman of this city complained to us a few days since of the want of that universal public interest in or sympathy with such improvements as are for the general good. "We are divided," he said, "upon everything. Not by the ordinary divisions of local factions or petty interests, but by such large influences as either thwart the object sought for altogether, or start it into existence so crippled and sickly, that it will never be productive of the good results it would otherwise secure. There seems to be nothing like a community of enterprise with us. If an improvement is suggested for either end of the city, the citizens of the other attack it; if the improvement is general, then a faction is organized to defeat it. But what is much worse than these, the rich men of our city, those who own the houses and the land and the money, and control the corporations that have grown rich from their impositions upon the people, although the largest beneficiaries of every improvement, are the least willing to contribute anything towards the advancement of such works; and if by any means they are likely to be forced to such support, they throw every obstacle in the way."

Recognizing the truth of this position, we very naturally asked, What shall we do about it? This we found was a question much easier asked than answered. Objections are easily made and theories are about as easily propounded, but established customs are not so readily overthrown, and a whole community with fixed habits, and grooved thinkings, are not changed like the righteous at the millennium. They are affected by the steady and constant accretions of the slow growth of culture—they must be educated out of the old and into the new, and this again is only ac-

complished by that constant "pounding" that is said to be the secret of business success.

It is a misfortune that this negative or divided feeling infects our people. There can be no doubt that our public interests are affected unfortunately by it, and that our city is permitted to progress but slowly; whereas, under a different policy, it would keep pace with the times, and be the recipient of its great natural advantages. But it is a peculiarity of human nature to avail itself of the opportunities for ease, and comfort, and relief, from the perils of business life, and when these are attained, their fortunate (or perhaps unfortunate) possessors become wonderfully conservative. The progressionist is thus changed—the radical converted—the active getting period of life passes away, and the man becomes selfish and care-taking. It is for these reasons that young and middle-aged men, in the pursuit of fortunes and honors, are more active, energetic and enterprising than when they have reached the goal of their efforts, and why young or new towns and cities are more enterprising than when they become older.

There is an abundance of latent energy, and big wise heads, and strong wills and great personal characters, in old communities, that, if stirred, could and would accomplish the most wonderful results in anything they would undertake; but how can they be called out? When the nation was in peril they moved, and with what tremendous results the world knows. But nothing short of some such danger seems capable of affecting their indifference to public interests, or invoking in them a spirit of reasonable liberality. They are so situated in their possessions that every improvement, whether made by the poorest inhabitant or the united efforts and means of their more enterprising fellow citizens, benefits these conservative gentlemen more than it possibly can those who struggle and suffer to create them; and thus their avarice is appeased, without either effort or risk upon their part. The same is true of all public improvements that are made; and so they grow richer and more indifferent to the welfare of the masses of the people, and less useful than as citizens they ought to be to their localities, and become the "bloated" real estate lords, and bondholders, and bankers, and the droues of the communities they live in.

It is no disgrace, we suppose, to become rich, but what a fearful loss of power for good is thus produced. What heavy dead weights such folks are upon the shoulders of the live men! No wonder there is an unholy longing in some places for a few "fashionable funerals."

But still the question, What shall we do about it? remains unsolved. It is a problem for the socialist, or, with a view to the common weal, for the statesman. Yet neither of these seem willing to grapple with it. It is

not our province to do so, even if we felt able or inclined. It is studded with difficulties, and requires learned, calm and scientific consideration. We can only state the question. We know the difficulty exists, and feel its baneful influences every day. And we, like thousands of others, here as well as elsewhere, ask the questions, What ought the wealthy citizens of a community to do towards such public improvements as are confessedly to their interest? Why should they not do what they ought? And if they will not do what they ought, what should other citizens of such communities do?

These, to our mind, are the main questions. There are minor considerations that grow out of these and may lead a subtle thinker to almost any extent; but, for the present, is is enough that we recognize the growing evil, and ask ourselves, for serious deliberation, What shall we do about it?

The Prosperity of the Country.

Senator Morton, in his brief address to the members of the Cincinnati Chamber of Commerce on Saturday last, gave an encouraging prospect of the national prosperity.

In substance, he said that the late treaty concluded with England placed the United States in the highest possible position with the nations of the world, and commanded respect for our power and confidence in the obligations of our people. It guaranteed to us a long period of peace, and an uninterrupted progress in the development of our vast and varied interior resources, and the establishment of profitable commercial relations with the trading peoples of the earth.

He thought there were staunch assurances of but few difficulties and much sunshine, in a mercantile point of view, for us. That there is more confidence in the stability of the country and the capabilities of the people, as well as their commercial integrity, than there had been during the whole experience of his life.

The honorable gentleman closed his remarks by saying that six years of doubts and fears have passed since the close of the war. The threatened panic had been avoided, and that there was now no apprehension of such a calamity. Confidence was slowly rising—the fevered activity that speculation superinduces was substituted by steady and healthy action.

We have not attempted even to follow our distinguished visitor in all his views upon the glorious future that is now dawning upon this country, nor to give his strong, terse, vigorous expressions, but merely an outline of a few strong grounds for what he so earnestly stated.

There can be no doubt that there is a general belief among all classes of our business men that we are entering a cycle of prosperity, not as the reaction or vigorous rebound of a period of depression, but as the result of great individual and corporate activity; the knowledge of our extensive sources of wealth, the

demand for our products, the assurance that the limit of declining prices is attained, and the enormous volume of capital aggregated at the commercial centers of the country that holders are longing to set at work and render profitable. And in addition to all these, the bountiful wheat harvest now safely garnered, and the assurance that the rapidly maturing fall crops will be unusually large.

The outlook from this position is certainly most gratifying. We are a blessed and ought to be a happy people. It seems to us that it will be our own fault if we do not prosper during the coming half decade at least, as never people prospered before. United, free from internal dissensions or external misunderstandings, with the confidence and respect of the civilized world, universal health, vigorous and buoyant commercial spirits, an abundance of capital ready for activity, unsurpassed quantities of agricultural products, the mountains, valleys, and even the streams, from Penobscot bay to the coves and harbors of the Pacific, teeming with unexplored riches, and forty millions of intelligent people, ripe in business experience and scientific knowledge, and with strong hearts and vigorous brains—the most chronic croakers are struck dumb, and Senator Morton's bright picture is more than warranted.

Who knows but that we are in the beginning of that "good time coming, for which we have all been so anxiously watching and waiting. Let us all believe so, at any rate, and be encouraged accordingly. And if it be so, we shall thus make the best of the joyous event; and if it be not so, we shall nevertheless be all the better and happier for such a mistake.

NEW LINE TO ST. LOUIS.—The Cincinnati, Hamilton & Dayton Railroad has formed a new line from Cincinnati to St. Louis, via the Indianapolis and Vandalia route, and will run three trains daily with through coaches and Pullman palace sleepers on night trains. Will leave Cincinnati, commencing Sunday, July 23, at 9.45 P. M., reaching St. Louis Monday noon at 1 o'clock, and thereafter leaving Cincinnati at 7 A. M., 2 P. M. and 9.45 P. M., reaching St. Louis at 10.50 P. M., 5.40 A. M., and 1 P. M.

TORONTO AND NIPISSING RAILWAY.—The directors of the company which is carrying on this line, accompanied by a few invited guests—among others, Mr. C. J. Brydges, general manager of the Grand Trunk Railway of Canada—have made a trial trip upon the new road from Toronto to Uxbridge—a distance of 40 miles. The trip was considered a very satisfactory one, Mr. Brydges, and other gentlemen stating that they were favorably impressed with the appearance and prospects of the road.

RUSSIAN RAILWAYS.—At the commencement of this year, there were 3,505 versts of railways in course of construction in the Russian Empire. The longest of these lines was the Smolensk and Brest. The concessions granted for Russian lines have 85 years to run; at the end of that time, the lines conceded will revert to the state.

Personal.

Col. S. W. Morton, of New York, and President of the Kentucky & Great Eastern Railway Company, has been sojourning in our city for a short time. Col. M. is one of the purchasers of the Cincinnati & Great Northern Railway, and has recently passed over that work as far north as Van Wert, with a view to placing a force upon it sufficient to secure its completion within a short time.

It is quite possible that Col. Morton's business may induce him to make this city his headquarters. We hope this may be so, as he is, in addition to being a most estimable and social gentleman, a thorough and experienced railroad man.

Our good-natured and worthy friend, Gen. Ben. Le Fevre, of the Pennsylvania Central Railroad, spent an hour or so with us this week. The General looks remarkably well, though we learn he was badly knocked about in the late New York riots. We don't know how much fun there is in such a mess, but we will venture to say, if there is any, Ben. found it.

We learn from our exchanges that there was another Gen. Ben. Le Fevre in the riot, who did some ground and lofty tumbling at the first fire. This, we think, could not have been our General Ben., although he too is reported as a railroad man, because he is represented as having served in the Massachusetts Legislature. Our Ben. served only in the Ohio Legislature. No use in talking, gentlemen, there must be two Le Fevres.

W. A. Weston, of Greenville, connected with the Cincinnati & Mackinaw Railroad, made us a short but pleasant visit last week, Mr. Weston reports steady and satisfactory progress in the affairs of that old enterprise.

S. R. Stimson, the Superintendent of the Dayton & Union road, was in our city a few days ago, upon business connected with his road, and did not forget to call upon his friends in this office. Mr. Stimson is placing everything about his road in good order for the large fall business that it will have to do. We wish him success. He deserves it.

Judge McKemy, of Dayton, a gentleman well known throughout our State, and who devotes what time he can spare from his official duties to the study of the railway interests of the country, gave us an opportunity, late last week, to discuss these important subjects with him. The Judge is an apt scholar, and will soon become proficient in the intricacies of the railway profession. When he understands the other parts of it as well as he does the law, he will do to run a big enterprise.

The Judge has gone upon the line of the Cincinnati & Great Northern Railroad for a few weeks, to engage the people upon the line in the new movement to complete that important work.

Great Railroad Triumph.

Six Hundred Miles of Rail Changed in Seven Hours—The Ohio & Mississippi Railway a Broad Gauge no Longer.

This is a day of great railroad enterprises, and of mighty railroad feats. When the Union Pacific road was constructed and track laid at the rate of three and four miles per day, we thought there was nothing left to be done in this connection to astonish the people. But in this we were quite mistaken, for yesterday the Ohio & Mississippi Railroad authorities and those in their employ accomplished a work which for completeness of preparation, extent of the work and the dispatch with which it was accomplished, quite eclipsed all previous railroad feats.

In 1857 the entire line of the O. & M. road was opened, creating somewhat of a sensation, inasmuch as it was a broad gauge, being about 15 inches wider than the usual roads of the country. The capacity of its coaches, with increased comfort, attracted the attention of travelers, who were not slow to see the benefits which the spacious cars furnished them in their passage through the country.

There were those in that day that foresaw what has since become plain to many others, namely, that this increased capacity was at the expense of rolling stock and track, and that the broad gauge would hardly be able to compete finally with the narrow gauge roads, to which the railroad mud was more and more turning each year.

The officers of the O. & M. road were impressed for years with the disadvantages entailed upon them by the 6 feet gauge, disadvantages in connections, in the through car traffic, and in the increased amount of dead weight constantly attached to the broad gauge engines and cars, and a change was meditated as soon as it could be accomplished.

But it was not a child's work to make the change. A large outlay of money was necessary, and the preparations made were of no ordinary magnitude.

On the 28th of January last the change to 4 feet 9 inches was determined on, and the officers at once set themselves at work to prepare for the work. It was, however, not until April that active preparations began.

When it is remembered that the company had 340 miles of road, besides the Louisville division, 87 locomotives, 1,500 cars, hand cars and other machinery, besides sidetracks, all of which sooner or later had to be changed, a part of it before the change in the track, some idea of the activity of the measures to be adopted may be formed.

Anticipating the new order of things, 40 new locomotives were purchased, all of which have been delivered, and are now ready. Five new passenger coaches were provided. Twenty-eight engines and seven hundred cars of various kinds, were changed from the broad to the narrow gauge, the engines at a cost each of \$3,500.

Besides this the broad gauge rolling stock had to be so disposed as to have it all at last where the changes could be made, which was at Cincinnati, St. Louis, Vincennes, and Cochrane. Seven hundred and fifty new freight cars and three hundred new box cars were contracted for.

While this was going on men were busily employed preparing to change the track. All the curves were surveyed, and on nearly all of them the track was laid, inasmuch as here the change could not so readily be made by

moving in the old rails. The ties were chattered, that is, hewn off with the adze on the upper surface at the point where the old rail was to rest, which was $7\frac{1}{2}$ inches inwardly from the old position. To facilitate the business, in the alternate cross ties, at the point where the inner side of the rail was to rest, spikes were driven so that the rail, when released from its old fastenings, could be moved immediately against them, and at once occupy the new position. This work was proceeding for weeks. At the same time preparations were made to change side tracks. The switches, small as they are, were troublesome, but this was finally solved by cutting all the rods that would be needed, and then splicing them, so that when the splice should be removed the connection between the rod and the outer rail could be made at once. To still further expedite the business the old spikes in the alternate ties were removed, in order to reduce the labor on the day of change to the minimum.

The day for the culmination of the plans drew near, and there was nothing incomplete. The last passenger train on the broad gauge left Cincinnati and St. Louis on Saturday morning. At daylight the hands were sent over the road. The employees of other roads had been drawn upon to the number of nearly 1,000, swelling the whole number for the last day to about 2,500. The force was divided into squads of 7 men, each squad taking one mile, and the squads of each five miles assigned to a section boss.

At midnight, on Saturday, the rolling stock of the road was all disposed according to prearrangement, and the road bed was ready for the contemplated change. At the first blush of dawn yesterday morning the work commenced along the entire line. The squads in each section, divided in two parts, commenced at the outside of the section and worked inwardly, the two parties approaching each other. A part of the force drew the spikes that held the old rails, and when they were sufficiently advanced, others were ready to apply their tools, and shove the rail inwardly to the place designated by the spikes already driven—several rails might be removed at once, for it must be remembered that on nearly the whole of the road is the fish-joint rail, the several rails being bound together as one, so that it was like moving the whole track. The rail once moved to its place, the remainder of the party came, and in the alternate ties drove the outside spikes, which finished the work.

The first section finished was at Adamson, at 4.25 in the morning. This was followed by others that came in quick succession, so that by 11 o'clock in the morning, T. Gazlay, Esq., the attorney of the road, received a dispatch from Engineer Lovett, saying that the work was done, having been accomplished in an average time to each section of about seven hours.

It was a great work grandly prepared for and triumphantly achieved. Without disparagement to any, we may say that all the work pertaining to the superstructure and track was prepared for by Thomas D. Lovett, Esq., chief engineer of the road, and executed under his direction and that of his faithful subordinates, while the disposition of the rolling stock and clearing the road for the change was under the control and management of J. L. Griswold, Esq., general superintendent. That they both did their duty faithfully and ably our readers need not be informed. The road, with its strong broad bed, hardly equaled now for the capacity of its foundations, will

this morning bear the first passenger train of the new gauge, leaving the city at the usual hour—a splendid triumph for all concerned.—*Gazette*, July 24.

The above is all very well in its way, but is there not a superfluity of praise, as shown by the result itself. It was intended to have the work done by sundown,—it was completed by eleven o'clock. A large number of employees were paid full day's wages—Sunday wages at that—when half the number of men could have done the work soon enough for all practicable business. In advance, we are told, all the measurements were made, the inside spikes driven, and equal to seventy-five miles of new iron laid in position.

The Richmond & Fort Wayne Railroad.

IT IS TO BE LEASED TO THE GRAND RAPIDS ROAD.

At a meeting of the stockholders of the Grand Rapids & Indiana Railroad at Sturgis, Michigan, on the 19th inst., a contract for leasing the Fort Wayne, Richmond & Cincinnati Railroad to the former for the term of 99 years, was agreed upon and accepted by a large majority of the stockholders. The proposed parties to the lease are the Cincinnati, Hamilton & Dayton road, Pennsylvania company, now operating the Pittsburg, Ft. Wayne & Cincinnati Railway, Grand Rapids & Indiana Railroad Company. The following are leading conditions of the lease: The Richmond road, when ironed, to be equipped at the joint expense of the Grand Rapids & Indiana, Cincinnati, Hamilton & Dayton and Pennsylvania companies and operated in their interest. The net earnings of the road, after paying all expenses of running it, are to be paid to the railroad company, or used for its benefit in paying its bond interest, the three companies furnishing funds for its equipment, reserving 10 per cent interest of said amount for their benefit. The three companies mentioned also guarantee the interest on one million eight hundred thousand dollars in bonds of the Richmond road, to pay any installment of interest that it could not meet. There was also an article providing for the transportation of freight to Cincinnati, which it was agreed that the C., H. & D. road throw all trade in this channel that they can control, the favor to be returned by the Northern road. We understand the above arrangements have already been sanctioned by the Ft. Wayne Railroad and C., H. & D. and Pennsylvania companies, and it is thought will soon be entered into. On the completion of the Richmond road between here and Richmond the consummation of this consolidation will give a continuous through line between Cincinnati and Traverse bay, a distance of about 470 miles.

QUEBEC AND GOSFORD WOODEN RAILWAY.

The maximum gradient on this line is at the rate of 200 ft. per mile, or about 1 in 25. The maximum curve is about 800 ft. radius. Rock maple is found to be the most durable wood for the rails; which are 4 in. by 7 in., the fourth face being the surface of the rail. The ties or sleepers on the line are chiefly spruce, but hemlock and tamarac have been found the most durable. The locomotive employed weighs 20 tons without tender. The cost of the road ranges from \$5,000 to \$8,000 per mile.

Chicago, Burlington & Quincy Railroad.

REPORT FOR THE YEAR ENDING APRIL 30, 1871.

There were in operation at the beginning of the year 603 $\frac{1}{2}$ miles. Added during the year:

From—	Miles.
Carthage to Quincy (opened December 25, 1870).....	39 $\frac{1}{2}$
Streator to Fox River Junction (opened January 15 1871).....	57 $\frac{1}{2}$
Keithsburg Junction to Keithsburg (opened January 15, 1871).....	5 $\frac{1}{2}$
Total.....	706

In addition to the foregoing, there were built, but not opened for business until after April 30, 1871:

	Miles.
West Aurora to Geneva (opened May 1, 1871).....	10
Mendota to Prophetstown (opened May 14, 1871).....	45 $\frac{1}{2}$
Total.....	55 $\frac{1}{2}$

Average length of road in operation during year ending April 30, 1871.....642

Average length of road in operation during year ending April 30, 1870.....532 $\frac{1}{2}$

Increase.....109 $\frac{1}{2}$

A comparison of the statistics of the year ending April 30, 1871, with those of the preceding year, shows as follows:

Earnings from	1870.	1871.	Incr.
Passengers...	\$1,718,323	\$1,830,304	\$11,980
Freight.....	4,514,629	4,949,684	425,055
Miscellaneous.....	388,820	527,696	138,876

Total.....\$6,621,773 \$7,207,685 \$585,912

Expenses	1870.	1871.
Exclusive of taxes...	\$3,754,555	\$4,202,977
Taxes	235,213	225,696

Total.....\$3,989,768 4,428,674

Ratio exp. to earn. 1870. 1871.

Exclusive of taxes 56.70 per ct. 58.31 per ct.

Inclusive of taxes 60.27 " 61.35 "

From the president's report we take the following:

The expenses have been about one per cent. in excess of the former year, and this year, exclusive of taxes, have been 58.31 per cent., and including taxes, 61.35 per cent. of the gross earnings.

It will be seen that the ratio of the expenses to earnings have increased within the last three or four years from about 53 or 54 per cent. to 81 per cent. of the gross revenues.

This is occasioned by the increased competition for business, having the effect to reduce rates, resulting from the construction of new roads, in which Illinois has been very prolific within the past few years, and which has been the natural result of the legislation of that State, allowing its municipal corporations to incur large debts to aid in their construction.

It has not been unusual for towns through which a projected road might be planned, to vote from \$6,000 to \$10,000 per mile to aid in building such projected roads, and often as a bonus! And this has been done even where there have been railroads in close proximity.

Of course there have been many roads built which will be of little value in themselves, and of no sufficient value to the towns through which they run to compensate for their cost. The system was a vicious one, and dangerous to the credit of the State, and has been not

too early brought to an end by the prohibition contained in the new constitution, adopted during the past year.

The volume of all classes of business, taken together, has been largely increased, and on both local and through freights the increase in tonnage is quite 20 per cent. in the aggregate.

Of the very large items of business, it may be stated that the number of cattle transported over the road has increased from 116,882 head in 1869, to 208,102 in 1870, being an increase of 91,220 in a single year.

The traffic in hogs was about the same as the year before, being 554,413.

The traffic in lumber, always large, has increased 20 per cent.

In corn, also always large, the increase has been considerable, though in that article an increase of 30,600,000 of pounds is not to be considered a large increase.

The increase of the gross earnings has been as stated.....\$585,912 08
And in operating expenses the increase has been..... 438,906 04

Leaving increase of net earnings \$147,006 04 for the present year over the past.

The whole net earnings of the year over operating expenses of all kinds, including taxes and of interest on the bonds of the company, has been \$14 54 per share.

While the local traffic of the road has been fairly maintained, the through business is rapidly increasing in volume, although done, for the most part, under sharp competition with the other lines.

The earnings on your road, for instance, from passengers to and from the Hannibal & St. Joseph Railroad, have been... \$299,557 06
From freight..... 1,007,957 63

Total.....\$1,307,515 39

The earnings of your road, from passengers to and from the Burlington & Missouri River road, have been..... \$195,217 74
From freight..... 654,613 04

Total \$849,830 78

It will be seen that the business exchanged with the Hannibal & St. Joseph has increased upwards of \$300,000 in the year, and that with the Burlington & Missouri has increased upwards of \$400,000.

The several roads which now constitute the tributary branches of your road have been aided by this company, not so much on account of their intrinsic value, as because, under the liberal laws of Illinois, allowing towns and municipal corporations to aid in constructing railroads, and with the anxiety of the country along their lines to have the roads, such inducements were offered as were sure to insure their construction, and the board has deemed it safest to lend the helping hand and make them tributary to your road, rather than leave the communities to seek alliances with other companies, and carry business, which could best be done by your road, to other avenues of trade.

About one half of these tributary roads have been in operation more than one year, and the earnings derived from the business of these is much more than adequate to paying the interest on the cost to this company.

The Quincy & Warsaw road, Ottawa, Oswego & Fox River Valley, the Illinois Grand Trunk (Prophetstown), are but just opened,

and, as yet, nothing can be said as to actual earnings, but it is believed that they will become equally valuable as tributaries to the others, while all will increase in value much beyond what they now appear to be worth.

The revenues of this company derived from the business furnished by the American Central road was, last year.....	\$208,824 11
From the Keokuk & St. Paul...	349,217 42
From the Dixon, Peoria & Hannibal.....	165,010 39
From the Carthage & Burlington	97,309 74
Total.....	\$821,362 66

Even these roads do not at present show what they will be worth to this company by their earnings. The oldest is but recently opened, and the business of the country is hardly yet accustomed to them. We think it safe to say that those opened the past year will be, perhaps, of more value than these.

The very large traffic now passing over the main trunk lines of the company, between Quincy and Burlington, and Chicago, is so heavy that the iron rail has been found inadequate to the business, and gives way rapidly under its weight. The expenses of maintenance of way, therefore, so far as the main lines are concerned, have become very great. Upwards of 78 miles out of 392 have been taken up and relaid during the past year, and it is quite likely, with the increased traffic, the rail iron will not last three years in the future.

Economy therefore demands that the whole main lines be laid with steel as fast as the iron gives way, though steel is much more expensive in the first instance.

The increased business, and the added number of miles of road operated by the company, have required increased power and rolling stock.

There have been put upon the road during the year, 22 locomotives, making the number now belonging to the company 175 in all.

There have been added to the rolling stock, 5 passenger cars, 9 new baggage, mail and express cars, 95 platform and coal cars.

The present equipment in cars consists of 69 passenger cars, 45 baggage, mail and express cars, 2,148 house, freight and cattle cars, 791 platform and coal cars, besides other cars for drovers, etc., and maintenance of way, used and necessary for repairs, etc.

The capital stock of the company now stands at	\$16,590,510 00
The bonded debt of the company, bearing interest, is...	4,316,000 00
Scrip issued to pay for Northern Cross Road from Galesburg to Quincy, not bearing int...	239,250 00
	\$21,145,760 00

Amount due to bondholders of Northern Cross, on foreclosure and sale of the road...	256,206 95
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Total.....\$21,401,966 95

In addition to this cost of the Chicago, Burlington & Quincy Railroad Company proper, are contingent liabilities for the bonds of the branch railroad companies, amounting to \$6,758,002.

It will be seen that these various roads have cost this company considerably more than the amount of bonds upon them.

There has been expended at Burlington in past years, upon grounds owned by the Burl-

ington & Missouri Railroad Company, in the Mississippi, in filling them up, \$304,631 50, which is due from that company, having been advanced with an agreement that it should be repaid by deeding a portion of the land made by it, and such money adjustment as might be found just and fair for the balance.

Railroads of the United States.

Progress of Railroads in the United States, and the Probable Extent of their Construction in the Future

We have, in previous series of the Manual, given a detailed sketch of the rise and progress of internal improvements in the United States. In no other country have similar works been undertaken and executed on so grand a scale, for in no other has there been a similar necessity for their use. Our people, advancing inland over unoccupied wastes, had no markets but those they left behind. The value of their products depended wholly upon the cost of transportation. The earlier settlements, consequently, followed, as far as possible, the lines of navigable water courses. As these were numerous along the whole coast, and of unrivaled excellence, they served for a long time as the means of social intercourse, as well as routes of commerce. It was not till after our people had crossed the Allegheny range of mountains, and descended upon the great plains beyond, that the necessity for improved highways began to be seriously felt. It was then seen that, without them, the trade and commerce of the vast region would float down its two great rivers, having their outlets—one under the climate of the tropics, the other under the cold, almost of the polar circle—and both far distant from the great seats of population on the Atlantic coast. It was felt, too, that the political fortunes of the future inhabitants of that region—in time to become a majority of the nation—would be moulded and controlled by their material interests; and that, as our government was founded on compact—not on force—the only way in which such widely separated communities could be held together would be to apply adequate means of intercourse between them. It was with such objects and spirit that all our great works were at first undertaken. A sentiment of patriotism, as well as of interest—a wise political forecast, as well as considerations of material advantage—mingled themselves in, and gave additional strength to, all propositions for the construction of our great lines of public works.

The works first undertaken were canals. Four great lines, of the kind, were commenced by the States of New York, Pennsylvania, Maryland and Virginia, for the purpose of connecting their navigable tide-waters with the branches of the Mississippi, or with the great lakes. From the formidable obstacles encountered, only one—the Erie Canal—was completed. The others, after making considerable progress, was abandoned, so soon as the superior value of railways, as a means of transportation, was fully proved. The latter have now, with the exception of the Erie Canal, wholly superseded the former. They are everywhere practicable, and are everywhere, and speedily, to become the common highways of our people.

The railroad first constructed in the United States was the Baltimore and Ohio, of which 23 miles were opened for use in 1830. It

was for two years thereafter worked by horse power. The following statement will show the number of miles opened each year since the date:

Year.	Miles in operation.	Annual Inc. of Mileage.	Year.	Miles in operation.	Annual Inc. of Mileage.
1830...	23	.....	1851...	10,982	1,961
1831...	95	72	1852...	12,908	1,926
1832...	229	134	1853...	15,360	2,452
1833...	380	151	1854...	16,720	1,360
1834...	633	233	1855...	18,374	1,654
1835...	1,098	265	1856...	22,017	3,643
1836...	1,273	175	1857...	24,508	2,491
1837...	1,497	224	1858...	26,968	2,460
1838...	1,913	416	1859...	28,789	1,821
1839...	2,302	389	1860...	30,635	1,846
1840...	2,818	515	1861...	31,256	621
1841...	3,525	717	1862...	32,120	864
1842...	4,026	491	1863...	33,170	1,050
1843...	4,185	159	1864...	33,908	738
1844...	4,377	192	1865...	33,185	1,277
1845...	4,633	256	1866...	37,017	1,832
1846...	4,939	297	1867...	39,244	2,227
1847...	5,599	669	1868...	42,277	3,033
1848...	5,996	397	1869...	47,254	4,999
1849...	7,365	1,369	1870...	53,399	6,145
1850...	9,021	1,656			

The number of miles constructed in the decade ending in 1840, was 3,513; in that ending with 1850, 5,508; in that ending with 1860, 21,614; and in that ending with 1870, 22,764. The greatest number of miles constructed in any one year was in that just passed, in which 6,145 miles were opened. The mileage constructed in 1869 and 1870 equaled 11,144 miles. The progress of railroads, as will be seen by reference to accompanying tables, were seriously interrupted by the war of secession. During the four years of its continuance, only 3,273 miles were opened—2,872 miles less than were opened during the past year. In that period only a very small extent of mileage was constructed in the Southern States. Within the past two years, great progress has been made in these works in that section of country.

Of the ultimate extent of railway mileage to be constructed in this country no safe estimate can be made. It is likely to increase very rapidly for many years to come. The progress made will depend largely upon the amount of increase of our population; but, as the same number of people double their traffic to these works every ten years, railroads will, for a long time, make rapid progress even in those States whose population is comparatively stationary. The State of Massachusetts has one mile of railroad to 5.27 square miles of territory. A similar ratio would give to the States of New York and Pennsylvania 9,000 miles of line respectively, or more than twice their present mileage. It would give to the State of Illinois nearly 11,000 miles, or two and a half times its present mileage. In each of these States, the construction of railroads will proceed rapidly till the ratio of Massachusetts is reached. The same may be said of other States having, in the aggregate, an area of 500,000 square miles. When a mileage of 100,000 miles is reached, the same necessity will be felt for the continued construction of these works that now exist.

Progress and Amount of the Earnings of the Railroads of the United States, and of their Tonnage Traffic.

The rapidity of the increase of earnings of the railroads of the United States, and of the quantity and value of their tonnage traffic,

is still more remarkable than the rapid progress of these works. Their tonnage, which last year exceeded 125,000,000 tons, has been almost wholly created by them since 1851, the year of the opening of the Erie Railroad, and the removal of canal tolls from the New York Central line. The earnings of all the roads in the United States that year were \$39,466,358; the earnings from freight being \$20,192,104, as shown in the following statement:

Statement showing the length, earnings from passengers, earnings from freight, and total earnings of all the railroads in the several States in actual operation in 1851.

States.	Miles of railroad in operation.	Earnings from passengers.	Earnings from freight.	Total earnings.
Maine.....	284	\$365,476	\$219,241	\$584,987
New Hampshire.....	415	537,961	686,103	1,224,064
Vermont.....	378	362,375	519,100	881,475
Massachusetts.....	1,167	3,831,675	3,233,139	7,064,814
Rhode Island.....	50	128,043	79,205	207,148
Connecticut.....	253	1,308,704	853,948	2,162,652
New York.....	1,054	4,800,431	2,841,849	7,642,280
New Jersey.....	269	1,731,562	901,157	2,632,719
Pennsylvania.....	898	1,836,652	4,161,297	5,997,949
Delaware.....	16	135,129	2,157	137,286
Maryland.....	324	665,857	1,403,517	2,069,414
Virginia.....	441	466,033	489,594	955,627
North Carolina.....	249	330,619	316,609	647,218
South Carolina.....	241	323,576	667,141	1,000,717
Georgia.....	658	432,063	1,386,592	1,818,655
Alabama.....	88	91,292	82,312	173,604
Mississippi.....	60	60,000	60,000	120,000
Louisiana.....	50	70,000	70,000	140,000
Kentucky.....	93	97,412	134,972	232,384
Ohio.....	638	960,610	740,382	1,700,992
Indiana.....	26	109,599	245,047	354,636
Illinois.....	116	147,676	188,634	336,310
Michigan.....	357	550,583	710,168	1,260,751
Total.....	8,876	19,274,254	20,192,104	39,466,358

The total earnings of the 50,000 miles of railroads in operation in the United States the past year, at \$9,000 per mile of line, equaled \$450,000,000. The increase in 20 years equaled \$400,000,000, or \$20,000,000 annually.

The total tonnage in 1851 of all the railroads of the State of New York, having a mileage of 1,703 miles, was 1,093,381 tons. The average tonnage per mile equaled 623 tons. The number of miles of railroads in the United States, and transporting freight that year, was 8,838 miles. A tonnage for all these, equal to that per mile of the railroads of New York, would give an aggregate of about 5,000,000 tons.

The gross tonnage traffic of the railroads of the United States is now ascertained with still more accuracy. In Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, Ohio and other States, the railroad companies are required to make returns, among other things, of their tonnage traffic. The tonnage traffic of the railroads of Pennsylvania, with connecting lines, the past year, equaled 43,643,799 tons, or 8,000 tons per mile. That of the railroads of Massachusetts for the same year, equaled 7,378,083 tons, or 5,438 tons to the mile. The tonnage of the New York roads for 1870, equaled 13,803,159 tons, or 4,000 tons to the mile. The aggregate tonnage of these three States, equaled 64,825,791 tons, or 6,338 tons to the mile of line. A similar tonnage per mile, for all the railroads of the United States, embracing say 50,000 miles of line, would give an aggregate of more than 300,000,000 tons. The tonnage of the railroads of the other States will not come up to the average of those named. The average tonnage for the whole can not, however, be less than 2,500 tons to the mile. Such a rate, for all our roads, assuming the average mileage in operation for the year to

be 50,000 miles, would give an aggregate of 125,000,000 tons. From this aggregate, however, must be deducted duplicated tonnage—or tonnage passing over more than one road, estimated at 30,000,000 tons. The net quantity would, therefore, equal 95,000,000 tons.

The value of this tonnage is estimated at \$150 per ton, after deducting, say 22,500,000 tons for coals, ores, and other low-priced freights—that of the tonnage for the whole country being estimated at the ascertained value of that of the railroads of New York. The tonnage of the railroads of that State is classified, in the returns made to the Legislature, in the same manner as is that transported on the canals of the State. The value of the tonnage of the latter, classified under the following heads: "Products of the Forest," "Products of Animals," "Vegetable Food," "Other Agricultural Products," "Manufacturers," "Merchandise," and "Other Articles," is carefully ascertained. Applying a similar rate of valuation to the different classes of the tonnage of the New York roads, the value of the latter would equal, on the average, \$150 per ton. It is assumed that the tonnage of the railroads of other States equals, in value, that of the New York roads. Such a rate would, for the merchandise tonnage of all our roads—to wit, 72,500,000—give a gross value of \$10,875,750,000.

The tonnage transported by the railroads in 1851 equaled 5,000,000. In 1870, the net tonnage equaled 72,500,000 tons; the increase of tonnage in a period of 20 years equaled 67,500,000, or at the rate of 3,375,000 yearly. The value of the railroad tonnage transported in 1851, at \$150 per ton, equaled \$810,725,200. In 1870, its value, at \$150 per ton, equaled \$10,875,750,000. The total increase of value in this period of 20 years, equaled \$10,065,354,800. The annual increase of value equaled \$503,267,740.

This vast commerce has been wholly created by the reduction effected in the cost of transportation. The cost, for example, of transporting Indian corn and wheat over ordinary highways will equal 20 cents per ton per mile. At such a rate, as already shown, the former will bear transportation only 125 miles to market, where its value is equal to 75 cents per bushel; the latter only 250 miles, where its value is \$1 50 per bushel. With such highways only, our most valuable cereals will have no commercial value outside of circles having radii of 125 and 250 miles respectively. Upon a railroad, the cost of transportation equals 1½ cents per ton per mile. With such a work, consequently, the circle within which corn and wheat at the prices named, will have a marketable value, will be drawn upon radii of 1,600 and 3,200 miles, respectively. The area of a circle with a radius of 125 miles is 49,087 square miles; that of a circle drawn upon a radius of 1,600 miles, is about 160 times greater, or 8,042,406 square miles. Such a difference, enormous as it is, only measures the value of the new agencies employed in transportation, and the results achieved, compared with the old.

The railroads of this country have an importance in the domestic economy of its people possessed by no other. They are, in fact, the markets to every portion of it. Wheat, that will bear transportation 2,500 miles over railroads, will not bear transportation for more than one-tenth that distance over ordinary highways. Wherever they are constructed, they give immediately, and everywhere, a high commercial value to the products of labor. The value and the influence they everywhere exert is well illustrated by

the following statement, prepared by the Treasurer of Iowa, of the progress of the railroads of the State for the past nine years, and of their earnings per head of population during this period:

Years.	Miles of railroad.	Miles opened each year.	Population.	Miles of railroad per head of Population
1862...	626	...	778,000	1.243
1863...	653	27	830,000	1.271
1864...	727	74	882,000	1.212
1865...	847	120	934,000	1.103
1866...	1,060	213	986,000	.930
1867...	1,238	168	1,038,000	.838
1868...	1,448	220	1,040,000	.734
1869...	2,081	533	1,142,000	.550
1870...	2,683	602	1,194,000	.446

	Gross Earnings.	Earnings per mile.	Earnings per head of pop.
1862...	\$1,109,346	\$1.772	\$1.42
1863...	1,570,546	2.405	1.89
1864...	2,553,699	3.512	2.89
1865...	3,871,783	4.572	4.14
1866...	4,118,006	3.884	4.12
1867...	5,867,501	4.778	5.65
1868...	8,024,931	5.541	7.36
1869...	10,409,950	5.002	9.12
1870...	11,932,352	4.447	10.00

The result for the whole country is almost equally striking. In 1840, there were 2,818 miles of railroad in the United States. At \$3,000 per mile of line, (a large estimate) their earnings were \$8,454,000, or 49 cents per head. In 1850, there were 9,021 miles in operation, the earnings of which, at \$4,000 per mile, were \$36,084,000, or \$1.55 per head. In 1860, there were 30,635 miles in operation, the earnings of which, at \$4,000 per mile, equaled \$122,540,000, or \$4.90 per head. In 1870, there were 50,000 miles in operation, the earnings of which, at \$9,000 per mile, equaled \$450,000,000, or \$11.75 per head. Such an increase of earnings measures, accurately, that of the wealth and commerce of the country due to the construction of railroads, and explains fully the eagerness with which works, which can produce such marvelous results, are pushed.

It would be interesting to compare the progress of the internal commerce of the country, in amount of value, with that of its population. In 1850, the net merchandise tonnage of its railroads did not exceed 4,500,000 tons, or 400 pounds per head. In 1860, the total tonnage was 18,500,000, or 1,200 pounds per head. In 1870, the total net tonnage equaled 72,500,000 tons, or 3,816 pounds per head. The value of the tonnage per head in 1850 equaled \$29; in 1860, \$84; in 1870, \$285 per head. Of course, this ratio of increase will not be maintained after railroad facilities shall have been supplied to every portion of the country. But in the older States, whose population shows the slowest increase, the tonnage of their railroads, without much increase of line, duplicates itself as often as once in ten years. The tonnage of the railroads of Massachusetts, in 1860, equaled 4,094,364 tons; in 1870, 8,044,498 tons. The increase of population of the State in this period did not exceed 12 per cent. The increase of tonnage of the railroads of New York for a similar period shows a ratio of increase twice greater. It is safe to estimate that the railroad tonnage of the country would duplicate itself as often as once in ten years, were there no increase of line or population, from the progress made in its industries and in the mechanics arts.—*Poor's Railroad Manual.*

The Great Union Railroad Depot at New York.

The great railroad depot in New York city, erected by Commodore Vanderbilt, has been completed and was formally occupied by the railroad officers on Saturday. It is the largest railroad depot in the country, if not in the world. The building proper is 692 feet in length and 240 in width. The center of the facade is covered with a tower 130 feet in height and flanked at each end by towers 110 feet high. The north end is constructed entirely of iron, and has ten huge iron arches for the ingress and egress of trains; while the eastern side, which is the least imposing, is for the most part built of brick, and will be used chiefly for the freight department. On the south side of the whole width of the building, to the depth of 40 feet, and to the height of 3 stories, is devoted to the waiting rooms and offices of the New York & New Haven Railway. On the ground floor there is, first of all, an ample baggage room; next the gentlemen's waiting room and that for ladies. On the second floor are the offices of the superintendent, the stationery and store rooms, the chief clerk, treasurer, attorney, president, and the directors. On the third floor are the conductors' room, store room for general ticket office, printing room, and five other small offices for undetermined purposes. The west side of the building for its entire length, to the same depth and height as on the south side, is similarly designed for the business and traffic purposes of the New York & Harlem Railway, the Hudson River Railroad, and the New York Central Railroad. In this way the west and south end to the depth of 40 feet are occupied solely by offices, and the central space, 550 by 200, forms a monstrous car house, to which admission is gained by the ten iron arches at the north end of the building. The height of this immense car shed is 90 feet. The roof is formed of glass and corrugated iron, and is supported by 31 semi-circular trusses of iron, each measuring 4 feet in width by 1 foot in thickness. High up on the walls, in letters 6 feet high, are inscribed the names, "C. Vanderbilt, President; W. H. Vanderbilt, Treasurer." There are 12 lines of railway running the entire length of this stupendous shed, divided into groups of two or three by raised platforms, composed of stone and cement, for the accommodation of the four lines which start from the Union Depot. At the south-east corner of the building are two lines of railroad which form the terminus of the Fourth Avenue Railroad, by which passengers will be enabled to step on board steam cars from the street cars without exposure to the weather. The cost of this immense depot, including the real estate, is estimated at \$3,000,000.

Cincinnati & Great Northern Railroad.

The following certificate of incorporation was filed at Columbus, July 23, in the office of the Secretary of State:

Cincinnati & Great Northern Railroad Company, capital stock, \$1,000,000. Corporators: A. J. Hodder, Durbin Ward, T. Wrightson, S. W. Morton and Robert Hedger. The termini of this road is Cincinnati and a point on the Ohio State line, in Williams county, north of Bryan. The route is through the following named counties: Hamilton, Butler, Warren, Prehle, Montgomery, Miami, Darke, Mercer, Van Wert, Paulding, Defiance and Williams.

The Importation of Iron.

Early this year we called attention to the enormous consumption of iron, and especially railway iron, in the United States. The consumption is still proceeding on a vast scale, and the United States have now become our best foreign customer for railway iron, having pushed Russia and India comparatively into the background. In October, for instance, we sent to the United States 28,219 tons of railway iron, as compared with 18,743 tons in October, 1869, and 18,723 tons in October, 1868. Again, in the first ten months of this year we exported railway iron to the United States to the extent of 341,629 tons, against 262,829 tons in the corresponding ten months in 1869, and 228,091 tons the corresponding ten months of 1868. The increase in the exports to October 31, this year, was thus no less than 78,800 tons, comparing 1870 with 1869, and 114,538 tons comparing 1870 with 1868. The increase in the demand for our railway iron among the Americans has thus been even greater this year than in 1869; and the extent of our commercial relations with the United States, in the matter of railway iron, may be gathered from the fact that of the whole exports of British railway iron made to October 31, this year, 36 per cent. or something over one-third, went to the United States.

Yet the Americans appear to be making great efforts to render themselves independent of foreign countries in the matter of iron. A report, drawn up by the Secretary of the American Iron and Steel Association, shows a wonderful expansion in the iron trade of the Republic. Several of the Western States, which a few years since were dependent upon other sources for their pig iron, now practically meet their own wants in that particular. The total production of anthracite pig iron in the United States stood in 1860 at 510,211 tons; in 1869 it had risen to 917,160 tons. The production of bituminous coal furnaces appears to have increased with equal rapidity; it amounted in 1869 to 553,341 tons, showing an increase of 63 per cent. over the production of 1863, or 74 per cent. over that of 1867, and of 105 per cent. over that of 1866. While the production last year stood at 553,341 tons, it amounted in 1854 to only 54,485 tons; and in the fifteen years ending with 1869, inclusive, the annual average increase in the make was 54½ per cent. The production of charcoal made pig in 1869, in the United States, was 392,150 tons, viz., 38,000 in the New England States, 134,000 tons in the Middle States, 206,500 tons in the Western States, and 13,650 tons in the Southern States. In the last named States a number of old charcoal furnaces, which were out of blast when the war ended, have recently been repaired and relighted. Three of these relighted furnaces are in Alabama—a State which is making a great effort to develop her mineral resources. The total production of pig iron of all kinds in the United States last year, was 1,916,641 tons, and the strides which the production is making are reflected in the fact that it has been more than doubled in four years.

All this is interesting enough, but we must pass on and see what America is doing in making railway iron to supply the wants of her ever-expanding railway network. Well, in 1861. American railway iron was made to the extent of 189,818 tons; in 1869 the total had risen to 593,586 tons. But even then, the Americans had in 1869 to import 345,000 tons, making with the 593,586 tons manufactured by themselves, a total consumption of 938,586 tons; and, taking into consideration the growth of the American railway system, the railway iron requirements of the Republic for the next five years are expected to average upwards of 1,000,000 tons per annum. The

production of American rolling mills besides rails, in 1869, was 642,429 tons, comprising 292,500 tons of bar and rod iron, 86,829 tons of sheet iron, 68,000 tons of plates, 17,200 tons of hoop iron, 146,400 tons of spikes and nails, and 72,000 tons of axles, etc. Of the same description of iron the United States imported 120,795 tons, making a total consumption of rolled iron other than rails, in 1869, of 763,215 tons. Notwithstanding the substantial progress which the American trade is making, the United States thus still continue to draw large supplies from Great Britain, the shipments thence to the Union of all descriptions of iron reaching an aggregate of 596,554 tons. Of this quantity, 300,346 tons consisted of rail, so that, after all, the work of railway construction and maintenance among the Americans is the great cause and mainstay of their large consumption of our iron.

Will this large consumption continue? We think it will, because, however strenuous the exertions of the Americans may be to develop their resources, and to stimulate the production of their own metallurgical interests, there never was a time in which so much activity was displayed in the Republic in the work of railway construction. In California, for instance, three or four great lines are now being built, and there is scarcely a State in which kindred projects are not on hand. A rumor comes to hand from San Francisco that a grand consolidation is about to be formed between the Pacific Railroad and its Eastern connections, on the one hand, and China and Australian steamship lines on the other hand, with a view to the control and development of the commerce of the Pacific Ocean. For this purpose a new company is to be formed, embracing the stockholders of both the railroad and steamboat companies, and it will be placed under the official management of several well-known English and American capitalists. But if this enterprise aims at the creation of anything approaching a monopoly, it is not likely to come to much, it is rather likely to develop new competitions. The railway and steamship seem likely to absorb and to create more and more American capital, and it is impossible to assign any limits to the demand for iron in the United States.—*London Colliery Guardian.*

COAL-PRODUCING COUNTRIES.—The United States stands third on the list of coal-producing countries; Prussia stands second, although in the quantity of coal it produces it remains far behind Great Britain, whose enormous production of this mineral has, during the last few years, exceeded 2,000,000,000 hundred-weight annually. It is, nevertheless, in advance of the remainder of the States of Europe, and even of the United States. The latest reliable statistics of the mining of coal in the whole world are those recently published by the Professor of Metallurgy of Leoben, Peter Trummer. According to these data, the production of coal in the different coal-producing countries during the five years between 1860 and 1865 amounted, in average numbers, to:

	Cwt.
Great Britain.....	1,336,000,000
Prussia.....	420,000,000
America (North and South).....	350,000,000
France.....	222,000,000
Belgium.....	206,000,000
Austria.....	80,000,000
The remaining States of Germany.....	40,000,000
Spain and Portugal.....	12,000,000
Australia.....	8,000,000
Russia and Poland.....	700,000
Turkey.....	500,000
Sweden and Norway.....	300,000
Total.....	3,214,000,000

RAILROAD NOTICE.

The Cincinnati & Great Northern Railroad Company.

The undersigned Corporators of the Cincinnati & Great Northern Railroad Company hereby give notice that Books of Subscription to the capital stock of said Company will be opened at the office of the Railroad Record, No. 167 Walnut street, Cincinnati, Ohio, on Saturday, the 26th day of August next, at 11 o'clock, A. M., of said day, and continue open at the same place each day thereafter (Sundays excepted), until stock is subscribed sufficient to organize said Company, and as much longer as said Corporators may direct.

A. J. HODDER,
DURBIN WARD,
T. WRIGHTSON,
S. W. MORTON,
ROBT. HEDGER,
Corporators.

CINCINNATI, July 27th, 1871.

7-30 GOLD LOAN

OF THE

Northern Pacific Railroad

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Other Securities.—All marketable Stocks and Bonds will be received at their highest current price in exchange for Northern Pacific Seven-Thirties. Express checks on Money or Bonds received, and on Seven-Thirties sent in return will be paid by the Financial Agents. Full information, maps, pamphlets, &c., can be obtained on application at any agency, or from the undersigned.

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CINCINNATI, - - THURSDAY, AUGUST 3, 1871.

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Pennsylvania Railroad Doings in Ohio.

We know of no better railroad than that of the Pennsylvania company. It is successful, well conducted and profitable. These are signs of a good road. We commend it for a well managed and safe road, for there are scarcely any accidents upon it. But we have some things to object to, and we shall state them plainly. First. The road passes through the whole State of Ohio, and has received great favors from this State. Notwithstanding the bridge controversy, the road has the use of the streets of Cincinnati for a great length, and every facility for crossing the city or the river. Both legislatures and city councils have given it great advantages, and the company should be at least civil. Now, if we understand, there is no office of the company in Ohio, and therefore no one who is responsible, or to whom application can be made for anything. There are freight agents and superintendents, but no one who is responsible for the company. Now, in common civility, the company should put an office in Cincinnati.

Again, \$8 for a little state room, and \$4 for a common berth, is simply absurd. Such charges are a gross imposition. Yet we paid on the Pennsylvania road \$12 for the berths of three persons, one of them a mere common berth. Are not such charges above those allowed by law? And can the road escape from this by saying the car belongs to another proprietor? Is it not carried over their road by their power? Are they not responsible for such a transaction? Certainly they are, and

if the laws are defective on this point, the Legislature should immediately correct the evil.

Looking to the enormous combinations of the Pennsylvania road, we have also looked into the condition of their road in Ohio, known as the Pittsburg, Cincinnati & St. Louis Railway Company, including the Little Miami Railroad. The elements of the road are as follows:

1. Pittsburg & Columbus, including Cadiz branch, etc. Miles of road in Ohio, 157½.

Stock \$4,250,422
Debt 8,179,937

Total stock and debts..... \$12,420,359
Cost per mile..... \$79,922 92

2. Newark & Columbus. 33 miles.

Cost \$1,360,000
Cost per mile..... 40,145

This road is run in common with the Central Ohio, but should be counted with the Pennsylvania.

3. The Little Miami Railroad. This road being permanently leased to the Pennsylvania road is now part of it. The elements are:

Miles 154½
Stock..... \$5,891,450
Debts..... 2,583,000

Total cost..... \$8,474,450
as represented by stock and debts.

Cost per mile..... \$51,586 01

Consolidating all these, we find the elements of the whole line included in the Pittsburg & Cincinnati line to be:

Miles 345
Total stock \$11,501,872
" debts..... 10,762,937

Total cost..... \$22,264,809
Cost per mile \$64,532

Deducting from the whole distance the Columbus & Springfield, the Dayton & Xenia, and the Dayton & Western roads, the distance from Pittsburg to Cincinnati is 277 miles.

No. of passengers carried..... 1,499,664
No. of tons carried..... 2,172,006
Gross receipts..... \$1,094,299
Expenses..... 3,206,396

Net receipts..... \$887,903

It will be seen that this is only 4 per cent. net. But this is owing to the fact that the road up to this year required a great deal of work to finish the Pittsburg part; and to the fact that the real earnings can not be told without counting in the Indiana and Virginia parts. The old Little Miami road made 6½ per cent. net, and taking the single line from Cincinnati to Columbus, it made 8 per cent.

The Pennsylvania road is proceeding rapidly with the bridge at Cincinnati, and will probably run cars over it before winter. The company has raised the piers 25 feet higher with great celerity. To our eye, it looks like a very sharp curve where they come off the

bridge, but as the passage of trains will be very slow, there will probably be no danger. To get the grade, the ascent will be commenced at some distance above the present depot. Altogether it will be a singular arrangement, and we can not help thinking will be attended with some difficulties. The expense of the new elevation will be near or quite \$400,000. To accomplish it, the company has been compelled to buy the whole square where the Niles Works were. One object, we presume, was to make a new passenger depot, at the east side of Deer creek; and we must say it is needed, for the present passenger arrangements are about as shabby as any we have seen.

Cincinnati & Great Northern Railroad.

We learn from the local papers, that the people upon the line of the above named road are considerably agitated by the proposition made them by the purchasers of the old Mackinaw road, and we should think from the reports that come to us that they were bound to secure the construction of that much needed work.

The proposition, as we understand it, is that the people along the line of the road shall raise the sum of one hundred thousand dollars, which is to be paid on or before the first day of March, 1873, providing that the road by that time is completed so as to run cars thereon from Greenville, in Darke county, to the junction of the Pittsburg, Fort Wayne & Chicago road at Van Wert, and in addition thereto secure for the benefit of the new organization such grounds as are necessary for station houses, depots and machine shops upon that part of the line.

This sum is the estimated cost of completing the grading and placing the ties upon the 55 miles of road that lays between the points above named. This offer is a liberal one, and as it involves the expenditure of a large sum of money among the people before any is required from them, and secures them the road without risk on their part, they can well afford to make a desperate effort to comply with the conditions of the offer. It is a good, and perhaps the best, opportunity they ever had to secure the rapid completion of their road, such an one as many western railroad companies would be quick to accept if they had the chance.

There is another great advantage to the people in having these parties control their road, and that is that it will not be a feeble fragment, that must rely on the local traffic for support, struggling to live, and not doing half the good that it otherwise would to the people who are making such efforts to call it into existence, but it will be merged into a long line that will make connections with the principal thoroughfares of the north, and that will find an independent entrance into the

city of Cincinnati. It will be well built, and most thoroughly equipped, and well supported, and the people will receive such benefits as frequent trains and a prosperous road can give them.

This we think amounts to a great deal, and ought to be another motive to stimulate the public effort now being made upon the line to comply with Col. Morton's proposition.

We understand that the question is to be settled within the next thirty days. We do hope that the people may succeed. They will never regret it. It will be money invested that will return quickly many fold. We were among the earliest advocates of this old project, as the columns of the RECORD will attest, and we should feel a prophet's pride in being able to chronicle therein its final and complete success.

Narrow Gauge.

There is no use of opposing it any longer, the narrow or three feet gauge must be the railway of the future. The thing has been talked of, and figured upon, and discussed, until there is but little more to say upon the subject; it is exhausted, and the results are that scientific, as well as what we call practical men, are favorable to the reduced gauge—the people have become convinced that it is what they want, and best of all the experiments that have for years been made with these light roads, corroborate all that theorists claim for them.

Railroads we must have—quick, certain and cheap transit for men and things, is the demand of the age. Give us these, and nearly all other material blessings will soon be added hereto. But railroads of the old style and size we can't have to the extent desired, because they won't pay; that is to say, the cost of construction and operating, and the wear and tear and waste, are so great that all the business that can be supplied by the country through which they pass (done at reasonable rates) will not pay the interest upon the investment. For some time we have been trying to remedy this. We have advocated the cash system in railroad construction, by which the first cost will be reduced. And the thorough drainage of the road bed, and the use of better iron, and improved machinery, and iron bridges, and reduced expenditures in management, by which the cost of operating would be diminished. All these have done something towards the end desired, a great deal indeed, yet not enough to accomplish what is absolutely necessary. We have finally struck the ax of reform at the very root of these difficulties. There is no use compromising with them any longer. Either railroads must be built only in densely populated sections of the country, blessed with great and diversified industrial resources, and as a thoroughfare between important business cen-

ters, or they must be modified so as to require less money to both construct and work them. The old system of subsidizing such works has passed away. Hereafter they must stand upon their own merits as productive enterprises, just as mills, and factories, and stores do.

What could be more reasonable or natural than that such improvements should be made suitable to the business of the country they are created to supply? There is no more reason why a railroad should be built with a capacity for doing four times the business it will ever have, than there is in doing anything else equally absurd. There is a fitness of things in railway construction as well as in everything else, and upon the discovery and observance of this depends their success.—Hitherto these requirements have been disregarded, and we have built the same size and kind of roads through sections of the country that never can be other than thinly settled, and supplying one class of freight that ample time can be had to transport to market, that we have through other sections that are densely populated, and that supply continuously such products as must find quick transit to points of consumption. "The eternal fitness of things" is thus disturbed, and we suffer the penalties.

If we look over our railroads and study their business capacity, and what they really do, we will find only a very few, and those of what we designate as leading lines, are worked up to their full capacity, and these only as they near their principal terminus, usually one of our great cities upon the seaboard; and after they have gathered the traffic from a thousand or more miles of the interior. The remainder are variously worked, from fifty down to fifteen per cent of their capacity, and therefore are either non productive as investments or yield but poorly on their cost, and this often at the expense of the road and its equipment, which grow worse and worse until some direct effort is made to revive them.

Now if such roads had been built at half the cost, and yet with a capacity to do the business of the country quite as well, if not better, than those now existing, how differently would stand the account; the investment would have been productive, the roads would be sustained and improved up to their highest point, the business of the country they serve would be done quicker, and cheaper, and better, greater accommodations would be given to the traveling public, safety would be secured, all interests connected with or affected by these improvements would be satisfied, and the number of such schemes would be doubled with the same outlay, and thereby parts of the country now languishing for the want of such outlets would be blessed with them.

This is exactly what the narrow gauge will effect. There is no doubt about it. Let the great through lines be extended, or new ones

made, of the standard gauge, with heavy cars and machinery; they have paid and will continue to do so, but let us change lateral lines, and local roads, and outlets to minor points, that a nation's products do not gather upon, to the American standard narrow gauge of three feet, with light cars, and light, quick machinery, costing less and paying more, and we shall have all the railroads we want, because they will pay, and capital will not have to be coaxed into them.

"Accessibility of West Virginia."

The West Virginia *Monitor*, speaking upon this subject, says:

Let the reader apply a rule to the map of the United States, and he will find West Virginia on a straight line, 1° from either New York, Philadelphia, Baltimore and Washington to Cincinnati and St. Louis. (A straight line from New York to St. Louis will also touch Cincinnati.)

2° From Baltimore, Washington and Norfolk to Chicago.

3° From Norfolk to the nearest point on the Union Pacific Railroad.

4° From Pittsburg to Charleston, S. C., through the magnetic iron ore region of southwestern Virginia.

5° From Pittsburg to the great southern railroad center at Chattanooga which is connected with New Orleans by an unbroken line of rail.

The Baltimore & Ohio Railroad extends through the entire State from east to west, touching the counties of Jefferson, Berkeley, Morgan, Hampshire, Mineral, Preston, Taylor, Harrison, Doddridge, Ritchie, Wood, Marion, Monongalia, Wezel, Marshall and Ohio, sixteen counties in all.

The Chesapeake & Ohio Railroad, now in course of rapid construction, and to be terminated within two years from this date, passes through or along the borders of Greenbrier, Monroe, Mercer, Raleigh, Fayette, Kanawha, Putnam, Cabell and Wayne, in all nine counties.

The Northern & Southern Railroad to connect Pittsburg with the Chesapeake & Ohio at Charleston, the capital of this State, and now being surveyed, will probably be located through Kanawha, Clay, Braxton, Lewis, Harrison, Marion and Monongalia, three of which have no other railroad communication.

The Pittsburg, Virginia & Charleston S. C. Railroad, also under survey, will run through Monongalia, Preston, Barbour or Tucker, and Upshur, Randolph, Pocahontas and Greenbrier, giving railroad facilities to at least four more counties not otherwise accessible by rail.

The Washington & Ohio Railroad, also experimentally surveyed all the way to Ravenswood and Point Pleasant on the Ohio river, finished to Hamilton, Loudon county, Va., and provided with capital nearly sufficient to complete the road, crosses the counties of Hardy, Grant, Tucker, Upshur, Barbour, Lewis, Gilmer, Calhoun, probably Wirt, and Jackson, ten counties in all, six of which without other railroad connections.

The Panhandle Railroad crosses Brooke county from east to west.

Then we have the projected fifty mile narrow gauge railroad from Ceredo to the large coal belt up Twelve pole river, which we have good reason to believe will ultimately be united with the slackwater of Coal river, follow-

ng the coal belt through the counties of Lincoln and Boone.

Thus we have forty-one counties out of fifty two, which compose the State, accessible by railroad at this time, or with reasonable certainty within very few years. Among these forty-one counties, not less than fourteen or fifteen will be either intersected or traversed by two different railroads.

In addition to this the counties of Wayne, Cabell, Putnam, Mason, Jackson, Wood, Pleasants, Tyler, Wetzel, Marshall, Ohio, Brooke and Hancock, are reached by the Ohio river, only four of which, Mason, Pleasants, Tyler and Hancock, are not immediately accessible by rail. The Kanawha river gives access to the counties of Mason, Putnam, Kanawha, Fayette and Nicholas, the four latter of which enjoy railroad facilities also.

This leaves only six counties out of fifty-two without communication by river or rail, except by turpikie or county road connection, requiring a drive of from six to twelve hours.

From this statement it is apparent that West Virginia is not very far behind her sister States in these great improvements, that place her vast industrial resources within easy reach of the demands of commerce.

In addition to the above named enterprises, that are doing so much good for that State, may be mentioned that of the Kentucky & Great Eastern Railway, a scheme recently organized, and in the hands of such strong parties as insures its success at an early day. This project will pass across the State (as we understand it) upon the table lands of the mountain range that divides the waters of the Kanawhas and the Monongahela, and will be extended to such points east and west of that State as will make the best possible connections with other roads that lead to the principal cities of the sea front, and the business centers of the west.

Such a road must be invaluable to West Virginia. It will be an arterial line through her dominions. A great trunk thoroughfare, from which other lines of railway may extend to every part of the State that demands and can sustain such enterprises. When this line is completed, we shall expect to find branches leading from it into her fertile valleys, the regions of her inexhaustible oil supplies, her marvelous deposits of coal, and her extensive forests of valuable timber, and by means of which every desirable part of the State will become easily accessible, and her enormous wealth, now latent and comparatively valueless, be called into commercial activity, and her people blessed with a high material prosperity.

— The Oregon & California Railroad Company have a large force of men grading between Oakland and Eugene city. Engineers are already locating the road on Smith's hill and Yoncalla valley. It is expected to reach Oakland by January 1st. We are also informed by a gentleman who has lately arrived from California, that all is life and activity on the California end of the route, and that it is being pushed rapidly this way. In less than two years we may expect to have railroad communication with both San Francisco and Portland.—*Oregon Sentinel*.

West Virginia

We have received the first number of *The West Virginia Monitor and Real Estate Advertiser*, published at Parkersburg, by J. H. Diss DeBar, late Commissioner of Immigration.

Mr. DeBar, in his introductory, explains the object of his new venture as follows:

But few of the political papers now published in West Virginia devote much space to the material interests of the State, or are patronized to a satisfactory extent by advertisements of real estate; and strangers consulting their columns upon such topics, generally find themselves more or less disappointed. In the course of our experience as an agent and dealer in West Virginia lands, we have long felt the want of a cheap and ready medium of correspondence between the buyer and the seller, such as is afforded by the lively real estate journals published in the other States.

During our late incumbency as Commissioner of Immigration, we have published and circulated abroad many thousand books and pamphlets descriptive of the resources of the State, but it was supposed that these public documents could not well be used as a channel for the advertisement of private property, without detriment to the impartial character of the general information conveyed in the text. Hence the reader contemplating investment or settlement in our State, was still left without those practical data and points of connection which the *Monitor* is intended to supply.

Although relieved of the delicate responsibility attaching to an official position, we propose, in the management of this private enterprise, to preserve that strict regard for truth and facts which in our former efforts to attract attention to our State, we have always found the most successful policy. No enterprise, whether corporate or private, depending for success upon the confidence of the public, will be commended in these columns, unless we are thoroughly convinced of its good faith, soundness and practicability. And while all advertisements of real estate are admitted upon equal terms, we reserve for ourselves the privilege, whenever deemed necessary, of modifying the description of the property so that no false impression may be conveyed in regard to quality and title. We have maturely studied the conditions of success in an undertaking like this, and shall endeavor to lay its foundation with a view to that reliability and stability of character, which alone can secure the largest amount of benefit to the public, and eventually to ourselves.

This is a good announcement of a good purpose, and we most heartily hope it will attract the attention it deserves, and be instrumental in bringing out the wonderful resources of that gifted but neglected State.

The *Monitor* ought to be supported by every person interested in West Virginia, and it should have a large circulation in our Eastern States, and in those parts of Europe from which such large numbers of persons are emigrating to this country.

— The Portland (Oregon) *Herald* is informed, by Mr. Wm. Davidson, that 23 miles of the West Side Railroad will be completed before the rainy season sets in. A large force of men will be employed in the work.

Personal.

Col S. W. Morton, President of the Kentucky & Great Eastern Railway, returned from a trip northward, through the counties of Darke, Mercer and Van Wert, whither he has been examining the old road bed purchased by him for the Cincinnati & Great Northern road. The Colonel reports that the road bed is in good order, that the country is full of the finest crops, and that the people are so appreciative of his proffers to build them a railroad that they have gone to work with a will and a determination to comply with his requisitions that are sure to succeed.

The Colonel left on Saturday last for New York, expecting to return to our city again within a week.

TENNESSEE ROADS.—The state railroad commission, composed of Governor Senter and others, have issued an order of sale of the Knoxville & Charleston, Rogersville & Jefferson, and Knoxville & Kentucky Railroads, with their franchises, rolling stock and equipments, at public auction on the 20th of next September; and unless the decree of the chancery court shall be complied with by the Nashville & North-western Railroad, ordering the payment of its debt to the State within thirty days from the 8th day of July, 1871, that road, with its franchises and equipments, will also be sold. It was also ordered, that the interest of the State, being its mortgage debt in the South-western Railroad, and Western & North Carolina Railroad, will be sold.

It was also resolved that in the meantime sealed proposals for the said roads and debts will be received by the commissioners, and can be sent to the comptroller at Nashville, to be opened on the day of sale, and should any such proposals be acceptable to the commissioners, no sale of the road to which they apply will be made; but if no such proposals are received, then the sale is to proceed. The commissioners provide that payment may be made in bonds of the State and their coupons, one-fourth at the date of sale, and the residue in one, two and three years from the day of sale, with personal security and a lien upon the property.

The president of the South-western Railroad is here, and offers to purchase said road for the stockholders.

— The Third Avenue Horse Railway, of New York city, is 8 miles long, and the average time for a trip is 80 minutes. The first cars were run on October 10th, 1855, and on that day carried 22,000 passengers. The company now employs 800 men and 1,800 horses, and runs 300 passenger cars. The depot is an extensive brick structure, to which another story, costing \$200,000, is to be added. Every week 450 hales of hay and 3,700 bushels of corn and oats are used for horse feed, which is ground and mixed by steam power. In 1870 there were 25,500,000 passengers carried on the road, and the daily receipts ranged from \$3,500 to \$5,000.

— The sale of internal revenue stamps for the fiscal year ended June 30th, 1871, for tobacco, snuff and cigars, shows an increase of \$1,500,000 in receipts over the previous fiscal year. From the sale of whiskey stamps there will be a falling off in receipts.

Report on the Viaduct Railway.

The report of Judge Hilton, president of the Viaduct Railway Company, has been published, and places before the public authentic information respecting the construction of the proposed work. Engineers have been for some time employed in grading and making calculations as to the cost and most desirable mode of operations, and the results are embodied in the report, and may be regarded as authentic and reliable. The total expenses of construction and equipment, including purchases of real estate for the double line along each side of the city, is estimated at \$50,000,000, as follows:

ESTIMATED EXPENDITURES—BOTH BRANCHES.

Real estate \$1,000,000 per mile, for a total of 15 miles, east and west sides.....	\$15,000,000
Construction, rolling stock, &c., \$2,000,000 per mile.....	30,000,000
Probable contingencies, under estimates, &c.....	5 000,000
	\$50,000,000

ESTIMATED INCOME—BOTH BRANCHES.

Passengers.....	\$13,000,000
Freight, mail matter, &c.....	5,200,000
Rents of stores.....	800,000
Gross annual income.....	\$19,000,000
Deduct expenses of management.....	8,500,000
Net annual income.....	\$10,500,000

These estimates, prepared by competent engineers, and endorsed by our shrewdest business men and capitalists, may be regarded as trustworthy and correct. They indicate that the undertaking is likely to prove amply remunerative to investors. The estimate of 50,000,000 passengers a year for each line is more likely to be under than over the mark. 70,000,000 passengers a year are now carried by the various horse railroads between Broadway and the East river. This is exclusive of the large number conveyed on the various steam railroads, stages, and steamboats. There can be no doubt that the travel will increase in proportion with the facilities afforded, and that after the first few years, the Viaduct Railway will yield a constantly and rapidly increasing revenue.

We are glad to see that Judge Hilton, in his report, lays considerable stress upon the freight transportation business. This is a feature of the Viaduct Railway that has heretofore been too much overlooked. It virtually connects, or can be made to connect, every merchant's store in the city with the entire railway system of the continent. If the proposed extension of the railway from the City Hall to the Battery takes place—as it no doubt will—no store or warehouse will be more than half a dozen blocks from a shipping point. It will then be the fault of our railroad managers, generally, if they do not afford facilities for the transportation of goods by the Viaduct Railroad, without break of bulk, directly to any or all the leading commercial centers in the United States. The new dock improvements will afford facilities for the discharge of grain directly from the railway car or canal boat into the holds of the trans-Atlantic vessels. In the same way the Viaduct Railway Company ought to make arrangements for the shipment of goods directly from the stores of our merchants to their customers in the Far West without reshipment or break of bulk. In that case the \$5,000,000 a year

estimates for freight may be doubled and trebled in a short time.

Practicable arrangements of this kind for the rapid transportation of goods to the interior, would indefinitely increase the business capacities and wealth of our city. The long line of trucks and carts employed in hauling goods to and fro between the up-town freight depots and the down-town warehouses, might then be dispensed with to a large degree. It costs almost as much to send a load of goods one mile in the city, by a drayman, as it costs for sending it 500 miles by steam. And in the present active rivalry of the Atlantic cities for the Western trade, even the comparatively trifling difference between dray and steam car transportation for a couple of miles may decide the entire current of trade.

To pass, however, to the other points of Judge Hilton's report, we find that the estimate of \$1,000,000 a mile for real estate is predicated on an average cost of \$12,500 for each lot. There is an average of 80 lots to a mile. The height or elevation of the proposed railway is not stated, but it is understood that it will be about 30 feet above the level of the street, or nearly level with the top of the third story windows. The Viaduct will consist of stone and iron pillars, masonry and earthwork, and will, of course, be sufficiently strong to avoid the slightest jar or shaking by the rapid locomotion. Each branch line will occupy 600 lots, making a total of 1,200 lots for the double line. The directors propose to convert about 1,000 lots into buildings or structures suitable for stores, warehouses and manufacturing purposes, from which an income of \$800,000 a year is anticipated. It is understood that the eastern branch will be constructed first, because the expense will be somewhat less, the facilities greater, and the demand larger for increased accommodation for travel on that side of the city.

THE NORTH MISSOURI RAILROAD.—Attorney General Baker, of this State, having been called upon for an opinion as to the validity of the mortgage bonds for the payment of which the North Missouri Railroad is to be sold next month, replies that without considering the inherent power of corporations to mortgage their franchises and property, to secure indebtedness on their part, about which there is much conflict of opinion in the judgments of courts of last resort of the United States, he is constrained to the opinion that this railroad company, the North Missouri, had no authority to mortgage its franchises or property without the express sanction of the legislature, which the company did not have. He further is of the opinion that the North Missouri Railroad Company held no authority to borrow money or pledge the main line of their road for the construction of the west branch from Moberly to Kansas city, nor for the erection of a bridge at St. Charles, which is an enterprise owned and controlled by a distinct company. He is also of the opinion that the interests of the county as a stockholder will be served by an application for an injunction to prevent the sale of the road, and having the mortgage declared unauthorized. Judge Henry C. Clover concurs in this opinion.

Maine is sending granite for the construction of two of the largest bridges in the world. From Mosquito mountain, in Frankfort, it goes to St. Louis to build the piers of the great railroad bridge across the Mississippi at that point. The great bridge across East river, from New York to Brooklyn, is receiving material from Blue hill.

Increase of the Stock of the Lake Shore Railroad.

A meeting of the stockholders of the Lake Shore & Michigan Southern Railroad Company, to decide upon the question of issuing the fifteen millions of the capital stock hitherto unissued, was held at the office of the company in Cleveland, July 27th. Hon. Horace F. Clark, president of the company, presided, and George B. Ely was chosen secretary. The result of the vote is shown by the following report of the inspectors:

We, the undersigned, inspectors, do testify that at a regular meeting of the stockholders of the Lake Shore & Michigan Railway Company, held at the office of the company, in the city of Cleveland, in the State of Ohio, on the 27th day of July, 1871, called for the purpose of voting upon the question of authorizing the issue of the fifteen millions of dollars of the capital stock of the Lake Shore & Michigan Southern Railroad remaining unissued, and of which meeting and the object thereof, thirty days' notice has been given in one newspaper published in each of the cities of New York, Buffalo, Erie, Cleveland and Chicago, two hundred and thirty-eight thousand one hundred and forty-nine and one-half shares of the capital stock of the company were voted upon by the holders thereof, in person or by proxy in writing, in favor of the authorization of such issue, and eighty six and one-half shares were voted upon by the holders thereof, in person or by proxy in writing, against the authorization of such issue. We, therefore, declare that two-thirds of the stockholders of said company, voting at such regular meeting, being more than two-thirds of all the stock of the company, voted in favor of the authorization of the issue of fifteen millions of dollars of the capital stock of the Lake Shore & Michigan Southern Railroad Company remaining unissued.

[Signed]

HENRY E. PARSONS,
W. E. CLARKE,
E. C. SHELTON,
Inspectors.

CLEVELAND, O., July 27, 1871.

The aggregate amount of stock voted in favor of the proposition was \$23,814,950, and that voted against only \$8,650. The whole authorized capital stock of the company under the charter is \$50,000,000, the amount hitherto issued being \$35,000,000. The issue of the remaining \$15,000,000 is for the purpose of double-tracking the road, and other improvements.

At the same meeting it was voted to refer the conditions of the issue of the \$15,000,000 stock to the executive committee, which consists of H. F. Clark, Augustus Schell and James H. Banker. The knowing ones state the improvements contemplated will not by a large amount require the \$15,000,000, and that the residue will be distributed among the stockholders by selling them the new issue at a sufficient reduction to make a handsome thing for them. The time of the new departure depends upon circumstances.

At the recent annual meeting of the Bank of Montreal, it was decided to increase the capital of the bank to \$12,000,000. If this resolution be carried out and the capital increased to that extent, the Bank of Montreal will then be the third largest in the world, taking precedence next after the Bank of England and the Bank of France. In the United States the largest bank has but \$10,000,000 capital.

The Eastern Terminus of the Chesapeake & Ohio Railroad.

This is still in conjecture and dispute with those not in the secret counsels of the company. Richmond, West Point, Yorktown, Newport News and Norfolk are all contending for it. Yorktown being quite positive that it is the favored point, quoting, in support of its pretensions, a speech recently made by Gen. Echols, of Staunton, one of the directors of the road. But Gen. Echols has since explained that he meant to say that if Richmond did not meet all the requirements of the road, in shipping its freights, &c, then a terminus would be sought where deeper water could be obtained, either at Yorktown or some other more eastern point. Still it is true that the company is making a survey of a route to Yorktown, and it is said that Mr. Huntington, president of the road, has made extensive purchases of land in Yorktown and vicinity. This looks very much as if Yorktown had been definitely fixed upon as one of the ultimate termini, if not the terminus of the road. Yet, in recent communications to our city council, the board of directors of the company have expressed themselves as willing to fairly test the capacity of the port of Richmond to answer the demands of their road, and have suggested three routes through the city by which they would be willing to connect the road with the wharves on the river. Yesterday afternoon, Gen. Wickham, vice president of the road, accompanied a special committee of our city council to examine the proposed routes, and the committee seemed to incline most favorably to that of a tunnel, 3,350 feet long, through Church hill, the highest hill of the city. The estimated cost of this tunnel is from \$200,000 away up to \$500,000, and it is a demand of the Chesapeake & Ohio Railroad Company that Richmond shall foot the bill. The committee has as yet arrived at no definite decision, but I am persuaded that it will report in favor of making the tunnel for the road, so that it may have no excuse for giving this city the go-by.

— The lease for ninety-nine years of the Jeffersonville, Madison & Indianapolis Railroad to the Pennsylvania Central having fallen through, the officers and directors of the Jeffersonville Railroad have been negotiating for the sale of their road and stock in the Ohio river bridge. It is understood arrangements are so far completed that the road will pass into the hands of the Pennsylvania Central corporation at an early day. It is understood the Pennsylvania Central takes \$2,000,000 in stock in the Jeffersonville road at 75 cents on the dollar, and assumes the bonded and other indebtedness of the Jeffersonville road. They also agree to take the stock owned by the Jeffersonville road in the Ohio river bridge at par. This sale will give absolute control of the J. M. & I. R. R., and a controlling interest in the bridge to the Pennsylvania Central company.

— The Central Railroad Company of New Jersey announced a dividend of 4 per cent. and Government tax, payable on the 20th ult.

— The New Jersey Railroad and Transportation Company announces a semi-annual dividend of 3 per cent., free of tax, payable on the 5th of August.

— The Delaware & Hudson Canal Company have declared a semi-annual dividend of 5 per cent, free of tax, payable Aug. 1.

Cincinnati Board of Trade.**MEETING OF THE DIRECTORS.**

A special meeting of the directors of the Board of Trade was held yesterday morning at 11 o'clock. The object of the meeting was to consider the subject of municipal taxes, and to call the attention of the city government thereto. It is proposed by the Board, in the interests of manufacturers, to suggest to the common council a mode of reforming the present method of taxation, by which the capital invested in the manufacturing industry of the city will be exempt from taxation, and at the same time to offer a plan by which the city may receive an equal tax revenue.

Dr. J. H. Pulte was present by invitation, and addressed the Board at considerable length upon the subject.

On motion of Mr. Thos. G. Smith, the subject was referred to the Committee on Taxation, with the request that Dr. Pulte furnish them with his ideas in writing, together with statistical reports relative to the same.

The following resolution, offered by Mr. Haven, was unanimously adopted:

WHEREAS, It is announced that the Tennessee Press Association will visit our city, reaching here on the 12th proximo; and

WHEREAS, It is believed that the commercial and manufacturing interests of our city will be subverted and advanced by extending to the members of said Association public welcome to the hospitalities of the city; therefore

Resolved, That a special committee of five be appointed, to whom the matter shall be referred, with full power to act as in their judgment may be deemed best."

The committee appointed is as follows: George F. Davis, Thomas G. Smith, James M. Clark, James L. Haven, and the Secretary.

In reference to the proposed Union Depot, a resolution was offered by Mr. Smith, and adopted, as follows:

WHEREAS, It is reported that a project has been inaugurated to construct a Union Depot to be jointly used by the railroads centering in Cincinnati, therefore

Resolved, That the Committee on Railroads be instructed to consult with the proper authorities, to aid them to the fullest extent in the immediate advancement of said enterprise.

On motion of Mr. Haven, Mr. Kinsey was required to act with the Committee on Railroads in relation to the above resolution.

Adjourned.

The Postal convention between the United States and Great Britain in relation to money orders has been received in Washington. It is to go into effect on October 1st, 1872. Under the regulations of the convention money orders for \$50 or less of American currency, or ten pounds, sterling, or less, may be obtained on England, Ireland and Scotland in the post offices of the United States, and on any portion of the United States in the post offices of the United Kingdom.

During June, the Philadelphia post office delivered 1,021,176 mail letters, 495,378 local letters, and 348,780 newspapers; 1,290,022 letters and 136,028 newspapers were collected.

The citizens of Rome, Ga., unanimously voted to subscribe \$100,000 in aid of the North & South Railroad to Columbus.

The Viaduct Railway.

According to a report of the president and engineers of the New York Viaduct Railway Company, the estimated cost of the two roads from the City Hall to the Harlem river at One Hundred and Thirtieth street, and from the City Hall to Manhattanville, each being 7½ miles long, will amount to \$50,000,000, or over \$3,000,000 a mile. It is proposed that each road shall have four tracks, two for fast travel, making stoppages at about two miles apart, and two for way travel, stopping every half mile. Twenty trains per hour, it is contended, can be safely run on each track, and as each train would average 300 passengers, it is calculated that on the four tracks, 24,000 passengers could be transported every hour, and 336,000 during a day of 14 hours. It is argued that at present 300,000 persons ride daily up and down, into and through the city of New York, on railroads, steamboats, horse cars and omnibuses, and that 125,000 passengers would make use of the Viaduct Railway without necessarily reducing the profits of the street cars and omnibuses. Assuming that the travel on each branch of the Viaduct Railway, costing \$25,000,000, will amount to 140,000 passenger fares per day, or \$50,000,000 per annum, the yearly receipts, it is calculated, will amount to \$9,500,000, distributed as follows: Passenger fares at an average of 13 cents, \$6,500,000, freight, mail and express matter, \$2,600,000, and rents, \$100,000.

The expenditures, it is calculated, will amount to \$4,250,000, leaving the net annual income from each line of viaduct at \$5,250,000. This sum, it is contended, will pay 7 per cent on \$17,000,000 of bonds, and a dividend of 50 per cent on \$8,000,000 of stock, or 7 per cent on \$12,500,000 raised on bonds, and a dividend of 33 per cent on an equal amount of stock. The engineers, after full consideration of the subject, did not consider it expedient to extend the main trunk line below the City Hall, as it would not be remunerative to run all the trains to the lower end of New York, but they have considered the propriety of constructing a two-track road, 25 feet in width, down to the end of the Battery. On this branch the cars would be propelled by steam, at the rate of 20 miles an hour, making stoppages about half-way. The expense, however, would be very great, and the construction of a line to the Battery is not advised. From the above statements it would appear that the cost of securing "rapid transit" in New York city will be immense, but that the projectors are very sanguine as to the success of the scheme.

Application of Compressed Air to Mining.

The most successful application of the pneumatic or compressed air principle in the performance of the mechanical work in coal mines is now to be seen at the Holmes Colliery, near Rotherham. Mr. Phillip Cooper, the well-known mining engineer and the manager of the colliery, has for some considerable time been engaged in making experiments in order to ascertain the extent to which the compressed air system could be applied. He has been so far successful that water is now being pumped from the pit and coal hauled along the tram ways by means of power obtained from compressed air. The air is compressed on the surface by a double-cylindrical steam engine, with 18 inch cylinder and 3 feet stroke, with two air compressing pumps, 20 inches in diameter and 3 feet stroke, worked direct from the steam engine. Near this steam engine is placed a large air receiver, while corresponding with

this in the mine, at a distance of nearly one mile, are three receivers connected by short cast iron pipes so as to form one, this plan being found necessary in order that the receivers could be made on the surface and connected in the pit without riveting, as safety lamps are exclusively used at the colliery. At this part of the mine also, is an air engine with two cylinders, each 14 inches in diameter, with a 12-inch stroke, working two double-acting force pumps 5 inches in diameter, with a 12-inch stroke. The compressed air is conveyed from the compressing engine in the mine in 7 inch cast-iron pipes. The discharge-pipes of the pumping apparatus worked by this compressed air are 5 inches in diameter and nearly 1,000 yards long, having a vertical lift of nearly 100 yards. The apparatus was first worked on the 6th of January last, and the steam engine was worked at the rate of fifty strokes per minute, a uniform pressure of 25 pounds per inch being maintained for eight hours at the surface and at the underground receiver. The air engine was worked during that time at the rate of fifty strokes per minute, 160 gallons of water per minute being raised. Since that time the results have been even more satisfactory, the apparatus working in a better manner than was anticipated.

Encouraged by this success, Mr. Cooper turned his attention to adapting the compressed air system to the hauling of coal, it having hitherto been found impossible to accomplish this kind of work by water power, and steam having also failed through the great difficulty experienced in economically conveying it long distances, or safely placing steam boilers under the ground. After a variety of experiments a successful result was again obtained, and coal is now daily being hauled by means of power supplied by the air engine. Many experiments have been made in various parts of the country to apply this principle of working by compressed air in coal mines, the result, in the majority of cases, being that it was found that a loss of about 75 per cent. of the power was sustained in the transmission of the air from the compressing engine on the surface to the air engine in the mine. Mr. Cooper has ascertained that this loss of power arose from the fact of the pipes employed to convey the compressed air being of much too small diameter, and the result of his experiments has convinced him that, with a sufficiently large air pipe, a power equal to one hundred horses can be very economically transmitted to a distance of one to one and a half mile, where it can be used for all the purposes to which steam and horse power is generally applied, such as pumping water in the dip workings of the mine, working coal cutting machinery, lifting or hauling coal, in tramping it along the ordinary bank levels or ends. Another advantage is, that when not needed, the compressed air, unlike steam or water, can be allowed to escape into the workings of the pit, with a result beneficial rather than otherwise. Nor need the principle be confined to coal mining, for Mr. Cooper suggests that it might be extensively and economically applied in large towns requiring mechanical power at many different places, if laid on in the streets the same as gas or water and the pressure produced at some central station. A series of experiments are now being made at the Holmes Colliery, in order to ascertain the relative power required for compressing the air and that given out by the air engines under different conditions of velocity and pressure of both steam and air. The introduction of this system at the Holmes Colliery is exciting great interest in the South Yorkshire mining district; and on Thursday last, a large party of scientific and other gentlemen interested in coal mining visited the colliery to inspect the new machinery now laid down.—*Colliery Guardian*.

Western Woodlands.

A very valuable article, with the above title, appears in the March number of the *Overland Monthly*. The author seems thoroughly acquainted with his subject, and his statement of the timbered area of the Pacific slope will be read with general interest:

"The forests of the State of California are estimated as covering an area of about 40,000 square miles. The famous Douglas fir forests of Oregon and Washington Territory, cover an estimated area of about 65,000 square miles. Idaho Territory is supposed to contain about 30,000 square miles of timber land, and Montana Territory about 35,000 square miles. British Columbia and Alaska Territory are, however, the possessors of the greatest area of forest land upon the Pacific coast, the former containing about 100,000 square miles, and the latter about 150,000 square miles. Alaska is pre-eminent as a lumber country, and whatever may be the real value of its mineral and other resources, its forests alone afforded sufficient inducements for the acquisition of it by the United States. The trees forming the forests of the State of Nevada, which are at best limited in extent, are too scrubby to be merchantable. It would thus appear, that about 420,000 square miles of the territory lying west of the Rocky Mountains are covered with timber. But to presume that the whole of this is valuable, or that all of that which is convertible into lumber or other marketable material is accessible, is erroneous. Thousands of square miles of these forests are composed of trees small in size and of inferior quality, and consequently of no commercial value. Much of it is also situated in localities distant from the sea-board. This will continue to remain untouched, unless other sources of wealth, offering greater inducements for the construction of artificial means of transit, are developed. Accepting, however, the hypothesis that an equal quantity of manufactured lumber can be obtained from every square mile of our woodlands as is obtained on the other side of the Rocky Range, the total quantity of timber at present standing on our shores may be estimated as not exceeding 300,792,542,898 square feet. To obtain this result, we must, of course, assume that all the timber growing on the coast can be converted into lumber. We are next led to inquire, how long will these forests last at the present rate of consumption? The present number of saw-mills on the coast are estimated at about 800. These mills possess the capacity to produce about 7,000,000 feet of lumber per day of ten working hours. Allowing, however, that the actual quantity manufactured does not exceed 2,000,000 of feet per day; by this means of consumption alone our entire forests will have disappeared, unless renewed, within the short period of sixty-five years.

Six hundred million feet per annum, seems to be a most fabulous estimate; but a careful examination of facts will at once convince us that it is not an excessive one. According to the annual statements of receipts of lumber at San Francisco, during last year, Puget Sound, Washington Territory, alone contributed 101,332,872 square feet of rough and dressed material to this market, and other logging camps on the coast contributed an aggregate of 117,902,029 square feet. In addition to the above, an immense quantity of piles, shingles, fence rails, railroad ties, telegraph poles, etc., was also received, for which no definite measurement can possibly be given. The lumber freights to foreign markets aggregated 14,489 registered tons, the same being 2,948 tons in excess of the shipments of 1869, and 11,909 tons more than the exports of 1868. Of this, 14,205 tons were shipped at Puget Sound, 11,767 tons at Burrard Inlet, British Columbia,

and the balance at the various lumber ports of Oregon and this State. More than one-half of the preceding estimate of our annual consumption is thus accounted for in shipments from our lumbering camps on this coast. And the woodman's ax is equally as actively engaged in supplying the domestic demands. Immense quantities are leveled to the ground, and consumed as fuel. The exactions of material to carry on our mining operations are almost as great, and an increased supply is required each successive year by our railroads. Every year the railroad system on the Pacific Coast becomes more and more complete, and many of those wooded localities, which are now inaccessible, will soon be penetrated, and the war of extermination against them carried on with renewed vigor. An idea of the great quantity which our railroads consume may be formed from the statement, made by good authority, that the lines at present existing in the United States require 218,100,000 square feet per annum of the very best timber for sleepers, requiring the denudation of 150,000 acres of land to obtain the same. A further quantity of 1,925,000,000 feet, valued at \$33,500,000, is consumed every year in the construction of cars and buildings, and in the general repairing connected therewith, and the locomotives running on these railroads burn annually a total of about 8,000,000,000 feet, worth about \$56,000,000. Many of the forests now furnishing the majority of the above material will soon be completely exhausted, and we shall then undoubtedly be called upon to furnish it. This new demand will greatly hasten that complete annihilation of our timber, which is otherwise only too certain to be speedily accomplished. Another agent, equally as destructive as the ax, and against which we have no apparent remedy, is also constantly at work. Not a summer season passes by but what thousands of acres are laid waste by fire, whose origin, frequently attributed to spontaneous causes, is too often the willful work of man. As it is evident that the period of the existence of our woodlands will be materially shortened by these additional demands, independent of the natural increase in the quantity of material required for legitimate purposes, it no longer seems necessary to inquire as to what length of time they will last, but rather, *How soon will they cease to exist?*

VEGETABLE DOWN—A SUBSTITUTE FOR HORSE HAIR.—Owing to a diminished export of horse hair from abroad on one hand, and to an increased demand for the article for upholstering purposes on the other, the price for horse hair has risen enormously in Europe within the past few years. The consequence has been that the article has been "doctored" to an extent which in many cases has deprived it of its value, while many proposed substitutes have failed to introduce or maintain themselves in favor with manufacturers. In view of these facts, it is interesting to learn that Mr. Kratzeustein, a manufacturer of Amsterdam, Holland, has been very successful in finding a substitute, which he has offered to the European market during the last three years, under the name of "purined vegetable down." This down is the envelope of the cotyledon of an Indian fruit, for the cleansing and working of which Mr. Kratzeustein had a special machine constructed. The advantages claimed for this material, which is offered on its own merits, are: great durability; greater lightness, as a mattress requires, according to its size, 6-8 pounds less of it than it would of horse hair; it is easily worked and reworked, requiring no preliminary preparation; greater cleanliness. Being a purely vegetable article, it can not become the home of moths or other vermin. It costs about 38 cents (gold) per pound.

Influence of Sound upon Rain.

A French *savant* maintains that it is in our power to procure rain at any time when the wind is in the right direction and there are clouds of vapor in the sky. The proper direction of the wind must be determined for each place of experiment, and the condition of the sky must be studied before attempting to hasten a rain fall by any particular sounds, such as the ringing of bells or the firing of cannon. During the siege of Sebastopol, as soon as the cannonading commenced, the sky was overcast, and a fine rain began to fall, which was sometimes followed by violent storms and whirlwinds.

As a consequence of the atmospheric changes, the mercurial column in the barometer commenced to vibrate, and it was possible to represent in a chart the exact state of the siege by giving the height of the barometer at all hours of the day. Whenever there was a truce of a few hours for the burial of the dead, the change in the height of the mercury at once indicated it.

It has been found that the explosions of powder magazines and the heavy blasts of mines, as well as the violent ringing of bells, have brought on a sudden fall of rain. In some instances the striking of a clock in the tower of a church indicated the exact hour of its commencement of the storm. Whether this was an accidental coincidence or attributable to cause and effect, it is difficult to say.

It was found by the same *savant* that of one hundred and thirty-three rain-falls, seventy-six commenced at the sounding of the hour by the church clock; forty-two at the stroke of the half hour, eight at the three-quarters, and seven at the quarter.

In large cities the varieties of sounds produce opposite effects, and may neutralize each other, and it is difficult to study the phenomena; but in small towns, if we notice the commencement of the rain, it is said that it will coincide with the stroke of the clock.

The explanation given is, that the vapor of water is formed of myriads of globules similar to soap bubbles, which burst when the percussion of the air is excessive, and thus run to water and produce rain. When the sky is overcast with such vapor, if we fire a cannon the equilibrium is destroyed, the globules burst, and the rain falls. If, however, the sky is clear, the discharge of a cannon can not cause rain, as there is none in the sky to be made to fall—but the vibrations in the air may effect some distant place where the clouds are already charged with vapor.

During the Crimean war, in Italy, and in Bohemia in 1866, it was observed that a rain storm attended nearly every battle. At Solferino there was a heavy storm of hail and rain between 4 and 5 P. M., which obliged the French to cease fighting, and thus probably saved the Austrian army.

M. L. Maout, who has studied this subject more than any other writer, recommends the systematic establishment of meteorological stations in communication with each other, to be provided with cannon of suitable caliber, and, when the wind is in the right direction, to hasten a rain-fall, or to drive the clouds to an opposite direction if a continuance of dry weather is desired.

He firmly believes that it is in our power to control the elements sufficiently to do all this. It is easy to criticize and find objection to the theory, but the best way would be to try the experiment. We read that in the present unhappy war in Europe the troops have suffered greatly from rain; and as the cannonading was kept up for nearly a week, there may be some connection between it and the condensation of moisture. The fact that great battles are often attended by rain has been observed since re-

mote antiquity, but no one has attempted to draw any conclusion from this circumstance, or to make any practical application of it. We also know that the guides in Switzerland interdict all talking, singing, or even whistling, when a party is ascending a mountain, as any sudden vibration in the air produced by the least sound is often sufficient to start an avalanche that could sweep away the whole company in a moment.

In view of such facts and observations it may be well to give the subject more attention than it has hitherto received. Meteorology is one of the most backward of our sciences, if it is worthy of being called a science in its present crude state. Observations with the barometer, thermometer, hygrometer, and other instruments are made at a large number of stations in the United States and forwarded to the Smithsonian Institute, and are published by the Agricultural Department of Washington every month; but no attempt is made to compare, classify, and systematize them, and they are of little value.

We have in the Museum of the Central Park of New York city, self-recording instruments, and a most admirable system of observations, under the control of Mr. Draper, which could be made of great value if the charts were published and the observations compared with those taken in other parts of the country.

In England a practical application of the observations is made by sending storm signals to the coast, but we have never heard of any attempts to "sow the wind and reap the whirlwind." It is also proposed in the United States to have storm stations established along the coast to warn our ships of danger.

As soon as the observations are established a more careful study of the causes of storms especially of rain, ought to be made, and if sound has anything to do with them, we ought not to be long in ascertaining the fact. The whole science of acoustics is one that has been more neglected than any other department of physics; but recently Helmholtz and Tyndall have devoted more attention to sound, and important progress has been made in our knowledge of it. The manufacture of all kinds of musical instruments has greatly improved, and the application of sound to flames show how it may be possible to make a record of each note very much as a photograph is taken of a picture.

That we shall, at some future period, arrive at an exact knowledge of storms and be able, in a measure, to control them, seems highly probable. If they can be influenced by sound, and we can at pleasure bring down the rain by a discharge of artillery, it would be a far better use of cannon than to devote them to the slaughtering of human beings in war as has been too long done by the various nations of the earth.

The discovery of a way by which sound could be devoted to the production of rain would not be any more wonderful than many of the triumphs of science that have been witnessed this century. The subject is worthy of the attention of our scientific men, and it is to be hoped that their investigations will ultimately be crowned with success.

Accounts from the seal fisheries on the Newfoundland banks continue to report unprecedented success. Three steamships have arrived at the ports of St. John and Harbor of Grace, Newfoundland, with an aggregate of 55,000 seal skins, and also full cargoes of seal oil. Immense numbers of seals, it is stated, blacken the ice for miles, and it is believed that the hundred vessels still out will be equally successful. The steamships will make two additional trips this season, and, it is anticipated, will be fully as successful as on their first trips.

Iron in Architecture.

The faults committed by those who use iron in construction, generally arise from the fact that they do not fully consider its capabilities and requirements when artistically treated. Iron is strong and conveys to the mind an idea of strength, but massiveness of appearance should not be the desired end when it is used in building. Here is a common error. From the nature of the metal it must, to insure durability, be protected from contact with the atmosphere; painting becomes necessary. The character of this painting is an important thing to be considered. The ignorant designer causes the metal to be painted white in imitation of marble, or brown to make it resemble sandstone, or gray, to secure the appearance of granite. No greater blunder could be committed. With almost equal propriety might a chimney be painted in imitation of wood. Iron can not be made to resemble stone for any great length of time looking at its surface alone, and even could this be done, a glance at the slender columns supporting an immense weight would cause their propensities to appear unsafe and ridiculous. But iron can be made to appear light and graceful, and, suited as it is for such an effect, it should be the aim of an architect to produce with it the style of building to which it is so well adapted. Consistency in architecture is desirable; more, it is absolutely necessary, and when iron is treated, not as stone or wood, but metal, there will be no violation of any recognized law.

There may be architectural effects and a due observance of rules of the different orders in iron as in stone. An acanthus leaf is as much of an incongruity in stone as in metal, and so with all other imitation of natural objects. But in all these there is no attempt at deception. We are not asked to believe that the objects represented are more than imitations. The acanthus leaf is not colored green to convey the idea that it is a vegetable. It would be false and inconsistent to attempt so palpable a deceit. But it would be hardly more foolish to do this than to paint iron in imitation of stone or wood.

Iron may be painted; and it may be made beautiful in itself. It may properly exhibit bright colors, and be picked out with gold and silver until its surface sparkles. It is for such showy, graceful effects that this metal should be used; a material perfectly adapted for store fronts or buildings of any class where the essentials are lightness, strength and showiness, rather than grave and ponderous effects.—*From the American Builder for April.*

Startling Adulterations of Tea.

It would be a comparatively small thing for the Chinese to sell us their old tea leaves for new tea, if they did nothing worse. But our valuable monthly contemporary the *Food Journal*, has been investigating the quality of the cheaper kinds of English tea, and in doing so has thrown some very unwelcome light into our teapots. The celebrated "Maloo Mixture," which we helped to expose some time since, consisted not only of old tea leaves, but of old willow leaves and of other second hand adulterations. In the wholesale market, Mr. Muter, who has conducted these *Food Journal* inquiries, found some gunpowder tea, which ought to be the best green, to consist of common caper, faced with Prussian blue. Some "Moning Congou" he found to be almost entirely dried leaves, and a sample of Kaisow was greatly made up of rice husks and other matters. But this is nothing to the results obtained by examining thirty-one samples of cheap tea bought of various retailers in London, and four bought in Birmingham. Of

these thirty-five samples, which were all tested by an experienced taster and valuer, not one was worth within eight-pence a pound of its price, and many of them were worth but a few pence a pound. One sample, bought at the cheap price of sixteen-pence a pound, is described as "very common dust, mixed with a small quantity of reddish unknown seeds, and iron filings much burnt;" while in one of the Birmingham purchases there was rice faced with plumbago and lampblack, with some pieces of free plumbago scattered through the mixture. Another mixture, sold at eighteen-pence a pound, consisted of "common fannings mixed with broken stalks, rice-husks, fractured tea buds and iron filings." Another sample contained pieces of decayed wood, fragments of reeds and stones, while another contained a considerable portion of "exhausted leaves rendered astringent with catechu;" and in another there were actually found a few feathers, scattered among rice and pea husks and leaves of the Chinese willow. The decoction produced by this last compound is described as "very mild and not unpleasant, but totally unlike tea," these rice husks and iron filings seem to be the commonest form of adulteration, and it is fortunate that it is so, for they are at least innocuous, and it is better to be cheated and not poisoned than to be both cheated and poisoned, as the buyers of higher class tea sometimes are. A common black tea faced with Prussian blue to make it sell as the finest green tea, is actually poisonous. Indeed, it seems likely that the real or supposed unwholesomeness of green tea is due more to its facing than to anything in the nature of the tea itself. There is, however, very little reason to believe that the better qualities of tea are at all seriously adulterated. Like other evils, this one of adulteration falls most heavily on those who can least protect themselves against it. Those who have least money to spend have least chance of spending it to advantage.

It is satisfactory to know that this adulteration is not so much the fault of our English tea dealers as of the Chinese. The demand of the English market is for cheap tea, and the ingenious Mongolians send us the cheapness if they do not send us tea. They find that whatever they send we buy. The Government takes duty on it as tea, the grocers buy it as tea from the wholesale dealers, and sell it as tea to their customers, and the customers, hiding the taste of the decoction with milk and sugar drink it as tea. It may, of course, be pleaded that it really does not matter what it is so that it does duty by providing a vehicle for the milk and sugar; but we may at least plead that even when sold as cheap tea, rice husks and iron filings are extremely dear. If they make a passible decoction let us know it and buy them at their natural price. The government, at any rate, has no right to charge a tea duty on these materials.—*London News.*

"CRYSTAL DIAMOND" CEMENT.—This cement is made according to the following recipe: "Take half-a-dozen bits of gum mastic, each of the size of a large pea, and dissolve them in as much spirits of wine as to form a clear liquid; then in another vessel dissolve in brandy as much isinglass, previously softened in water, as will make up a two ounce phial of strong glue, adding two small bits of gum of ammonia, which must be rubbed until entirely dissolved. This glue is then mixed with the dissolved mastic, and gently heated and applied on the fractured metal by means of a camel-hair brush, and taking care to make the operation as quick as possible, when the cement on its joints is scraped off and leaves no visible mark behind. The same result is effected on glass, china, or when fastening glass on metal or metal on glass, for bar-reliefs, instead of writings with gold leaf."

RAILROAD NOTICE.

The Cincinnati & Great Northern Railroad Company.

The undersigned Corporators of the Cincinnati & Great Northern Railroad Company hereby give notice that Books of Subscription to the capital stock of said Company will be opened at the office of the Railroad Record, No. 167 Walnut street, Cincinnati, Ohio, on Saturday, the 26th day of August next, at 11 o'clock, A. M., of said day, and continue open at the same place each day thereafter (Sundays excepted), until stock is subscribed sufficient to organize said Company, and as much longer as said Corporators may direct.

A. J. HODDER,
DURBIN WARD,
T. WRIGHTSON,
S. W. MORTON,
ROBT. REDGER,
Corporators.

CINCINNATI, July 27th, 1871.

7-30 GOLD LOAN.

OF THE

Northern Pacific Railroad

RAPID PROGRESS OF THE WORK.

The building of the Northern Pacific Railroad, (begun July last), is being pushed forward with great energy from both extremities of the line. Several thousand men are employed in Minnesota and on the Pacific coast. The grade is nearly completed 266 miles westward from Lake Superior; trains are running over 130 miles of finished road, and track laying is rapidly progressing toward the eastern border of Dakota. Including its purchase of the St. Paul & Pacific Road, the Northern Pacific Company now has 413 miles of completed road, and by September next this will be increased to at least 560.

A Good Investment. Jay Cooke & Co. are now selling, and unhesitatingly recommend as a Profitable and perfectly safe investment, the First Mortgage Land Grant Gold Bonds of the Northern Pacific Railroad Company. They have 30 years to run, bear Seven and Three-Tenths per cent. gold interest (more than 8 per cent. currency) and are secured by first and only mortgage on the ENTIRE ROAD AND ITS EQUIPMENTS, and also, as fast as the Road is completed, on

23,000 Acres of Land to every mile of track, or 500 Acres for each \$1,000 Bond. They are exempt from U. S. Tax; Principal and Interest are payable in Gold; denominations: Coupons, \$100 to \$1,000; Registered, \$100 to \$10,000.

Lands for Bonds. Northern Pacific 7-30's are at all times receivable at TEN PER CENT. ABOVE PAR, in exchange for the Company's Lands, at their best cash price. This renders them practically INTEREST BEARING LAND WARRANTS.

Sinking Fund. The proceeds of all sales of Lands are required to be devoted to the purchase and cancellation of the First Mortgage Bonds of the Company. The Land Grant of the Road exceeds Fifty Million Acres. This immense Sinking Fund will undoubtedly cancel the principal of the Company's bonded debt before it falls due. With their ample security and high rate of interest, there is no investment, accessible to the people, which is more PROFITABLE OR SAFE.

Exchanging U. S. Five-Twenties. The success of the New Government 5 per cent. Loan will compel the early surrender of United States 6 per cents. Many holders of Five-Twenties are now exchanging them for Northern Pacific Seven-Thirties, thus realizing a handsome profit, and greatly increasing their early income.

Other Securities.—All marketable Stocks and Bonds will be received at their highest current price in exchange for Northern Pacific Seven-Thirties. Express checks on Money or Bonds received, and on Seven-Thirties sent in return will be paid by the Financial Agents. Full information, maps, pamphlets, &c., can be obtained on application at any agency, or from the undersigned.

FOR SALE BY

JAY COOKE & CO.

PHILADELPHIA, NEW YORK, WASHINGTON,

Financial Agents, Northern Pacific Railroad Co.

By BANKS and BANKERS generally throughout the country.

THE LOBDELL

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COMPANY,

WILMINGTON, DEL.

Established in 1836.

All kinds of Railroad Machinery

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WM. W. LOBDELL, Secretary

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The  Sun.

CHARLES A. DANA, Editor.

The Dollar Weekly Sun.

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The Railroad Record.

E. D. MANSFIELD, - - - - - } Editors
T. WRIGHTSON, - - - - - }
A. J. HODDER, - - - - - }

CINCINNATI, - - THURSDAY, AUGUST 10, 1871.

The Railroad Record,

PUBLISHED EVERY THURSDAY MORNING,

By Wrightson & Co.,

OFFICE—No. 167 Walnut Street

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The Atlantic & Lake Erie Railway.

There is no railroad in the country so important as this, of which so little has been known or said. This road has sought rather to conceal itself than to trumpet its concerns abroad. It is known rather by its doing than its saying. We have made one or two notices of it in the RECORD, but we have seen little or none elsewhere. Having some recent information we will give our readers what we have.

The Atlantic & Lake Erie Railway is, in substance, to go from Toledo south-east through Athens to Pomeroy, the southern end passing through Sunday creek valley. The main object of this road is to supply the north-west with coal and iron from the mineral region of Perry, Athens and Meigs counties, and on the other hand to afford an outlet on the Ohio to the produce of central Ohio going south. Secondary to this, but of great importance, is the local trade and traffic of the interior counties, and the development of such an immense and invaluable mineral region as that in and about Sunday creek valley. A mere glance at these considerations will show that this road will produce two great results, one is in benefiting Toledo, and the other of more general importance, the development of Sunday creek and the region about it.

This road is almost all under contract, and a considerable part ready for the iron. The principal towns on the line, as under contract, are Chauncey (Athens county), New Lexington (Perry county), Granville and Hartford (Licking county), Bucyrus (Crawford county), and thence direct to Toledo. The road is, we believe, about 250 miles in length, a large

part of it passing through a country not aided by railroads. Its construction is undertaken on the true principle that the substantial capital, the basis of the road, shall be furnished by the people for whose benefit it is made. This has been done in a most liberal and sufficient manner. Large subscriptions have been obtained before the road was put under contract. Last year much of it was let out to substantial companies, and since that time much work done.

A gentleman interested in the work writes us: "The work of grading in this county (Licking) commenced two months ago, and we hope now to push it vigorously. From Bucyrus to Toledo the grading is well under way, and it is expected will be ready for the iron as soon as early winter, or before; so that we expect to have a portion of our road ready for the cars in a few months. The change of line through Fairfield county (the company had located their line on the west-ern side of Perry county, but now on the eastern side of Fairfield) is a happy one, and by it we save in cost of construction \$200,000 from the hill route in the vicinity of the Straitsville road, and will have no grade to exceed 30 per mile between Granville and New Lexington, and the country is as productive and beautiful as in any part of the State."

Having obtained a solid capital by private subscriptions, the company have put a first mortgage on the road sufficient to complete it; and unquestionably it will be a first-class security, since the road is located in a rich part of Ohio, and has the trade of the North-west at one end and the great mineral region on the south.

The mortgage on the road is for \$5,000,000, and made in trust to the Union Trust Company of New York, and arrangements are already made for the negotiation of the bonds.

The mortgage deed of trust is said by competent parties who have examined it to be one of the best and safest drawn instruments of the kind in this country. It provides for a sinking fund, for the price at which the bonds shall be delivered, and that the funds shall be paid over to the company on the engineer's certificate of completed sections, at the rate of \$16,000,000 per mile. As this will not be half the actual cost of the road, the security will be perfect, and as the road does not compete with other lines, but on the contrary is transverse to them, there is scarcely a conceivable contingency that the bondholders will ever have to coerce the road.

For ourselves, we think that this line must be a very profitable one; and our reasons are these: 1. That it has no real competition, but takes trade in a different direction from that of others. It takes the produce of the great central counties to the south, not the east, and it must be remembered that the trade of the south is now rapidly increasing. 2. We expect a great and extraordinary result from

the development of Sunday creek valley.—When, about a year since, we gave an account of that very interesting region, we have no doubt some of our readers thought us extravagant and enthusiastic. But whether so or not, we can say that we never saw a mineral region which, on the whole, is as valuable as that. One has only to see what vast results have attended the development of the coal region of Pennsylvania to see what we may expect here. We expect the completion of the Atlantic & Lake Erie road to be the beginning of great results in the Sunday creek valley.

The Cincinnati, Hamilton & Dayton Railroad Company.

This old and well managed company has recently caught the spirit of the times, and inaugurated a new and expansive policy that will not only sustain it as one of the best paying corporations in the State, in spite of all threatened competition, but add to its strength at once, and soon such a per centum to its income as will make its stock one of the most productive and stable investments in the country.

There can be no doubt about the wisdom of these new movements. The conservative period of its existence has passed, and it must move up with the times, and the railroad development of the country, and the circumstances which have been so rapidly forming about it. And we are glad that the McLaren administration had the sagacity to see these things, and the nerve to recognize and turn them to good account.

By these new alliances this company now controls as good a line to Chicago from this city as any other, and a first-rate route to Indianapolis and St. Louis, and a line to Fort Wayne and the rich region of the Western slope of the lower Michigan peninsula. It ought now to make a good connection with Omaha, then the trunk entrance into this city would be fed from all points, and worked up to its fullest capacity.

This seems to be pretty well understood, as the stockholders are sticking firmly to their interests in this road, and outsiders are trying hard to get hold of them. The stock is therefore rising.

Received.

We have received a most elaborate brief in the case of the Covington & Lexington Railroad Company, appellant, against Winslow, Bowler's heirs and others, appellees, a case now pending in the Kentucky Court of Appeals.

This brief was prepared by Peter Zinn, Esq., attorney for the appellants, and shows that it is a work of great research, that required patience, perseverance and learning to accomplish.

Mr. Zinn certainly makes a very strong case for his clients.

An Old Fossil.

There is one left, and he lives in Mercer county; he is opposed to railroads, and argues against them thusly: "O, they bring into the country a different set of people—folks with larnin, who want to git along without work; and who aint satisfied with one suit of hum-made, but must have store-clothes, and a clean shirt every week, and who go to specalatin and fursing 'round. They spile the country and are a cuss to it. They set all the youngsters crazy—can't make 'em work after that—they must have buggies and paper collars, and shined boots; then they aint so helthy, and doctors' bills run up like all sixty. It spiles bizness too, these railroads do. Wh'ever there is a railroad, they don't do bizness like we do—you can't sell so high to the people; these smart felloes come in and sell chuceper, and we'll have to pay a derved sight more for butter'n eggs; it'll spile the turtle, frog and catfish trade, we can't make nothing out of it then, the reservoy may as well dry up. And how are we ever going to pay our taxes? Much as we can do now, and more too. If our land goes up, it will all go up, and how are we going to foller it? And then look at them telegraffs, they is wherever railroads is, and they bring drought into the country, and draw the lightning, and bring the small pox and measles to the people. There's no use talking, men," said he, "I'm deadly opposed to railroads, and won't live in the county if one comes."

We snpossed all these old "autediluvians" were gone. It is a long time since we heard a croak from one of them; and besides, a short time since, an eminent showman advertised for rare cnriosities, and there was quite a hunt over the country for some relic of lost animals and things, and nothing of the sort was reported except the bones of an animal supposed to be of the kangaroo species. How this old fossil in Mercer was overlooked we can't imagine. He would have brought a good price, and will now, unless upon examination it is found that a breath of civilization will be likely to strike him dead. There is some danger of that. The malarious swamps of the Wabash, and the green, slimy spreads of Beaver, agree with him yet, though they are not what they were, and he may sicken and die even amidst their chilly charms and beanties.

It is a great pity this last lingering specimen of a miserable race can't be preserved until Mr. Darwin can be sent for, so that his famous theory of the "Descent of Man" from pollywogs and mollygrubs may be substantiated. He is the missing link, so long sought for, that is wanting to connect the African chimpanzee with the Hottentot. We hope the scientific men of Mercer will keep track of him, and when he rolls over, have him stuffed and sent to Darwin as a tribute to his genius in scientific researches.

For fear it may escape and die in the tangled wildwoods of Beaver, and be lost forever, wouldn't it be well for the enterprising denizens of that country to fence in some unclaimed eighty-acre lot upon the south side of the reservoir, and clothe this "What is it" with a breech clout, or a tow shirt, and an old-fashioned pair of barn-door trousers, and supply it with a barrel of tearbelly whisky, a gourd, a crossbow, a flint tomahawk, a three legged stool with a hole in the side to allow what it may have of a caudal appendage to pass through, a wooden nozzled go-devil plow, a thrashing flail, an iron hook with which to claw its food out of the ashes, and then let it live in peace, away from the annoyances of railroads, and steam engines, and manufactories, and printing presses, and public schools, and telegraphs, and sewing machines, and all the other works of civilization.

A Good Chance for Profitable Investment.

The Valley River Land, Lumber & Boom Company, of West Virginia, organized under a special charter granted by the Legislature of that State, is now making arrangements to construct a boom across the river, remove such obstructions as are in the way of large floats of logs and timber, and to engage extensively in the business for which the company is organized.

A competent engineer estimates that it will cost but about \$10,000 to put everything in readiness for business, and that large profits can be snstained, because

"This river and its tributaries above the Baltimore & Ohio Railroad at Grafton are navigable for floating timber for the aggregate length of at least one hundred and sixty (160) miles. For three-fourths of this distance the forest remains undisturbed and has no other outlet to market than by this river, rendering the right of booming under this charter of great and increasing value.

'Strips of country three miles in width on each side of the river, and its branches above the railroad, contain over six hundred square miles of superior timber, consisting in different localities of poplar, white oak, ash, cherry, walnut, locust, hickory, pine, and other varieties.

"The poplar, cherry, white oak and ash are more abundant and larger in size than such varieties are usually found elsewhere.

"This large and valuable area of timber land is nearer and more accessible to Baltimore and the Atlantic coast, than any other tract of similar size and value in the country."

A limited interest can be had in this scheme by addressing the president of the company, Benjamin Wilson, Wilsonburg, West Virginia.

— The Chicago & Alton Railroad earned last week \$131,823 68, an increase over the corresponding week last year of \$25,770 40, or almost 25 per cent.

— The contemplated tunnel under the Detroit river, between Detroit and Windsor, Canada, will extend 8,568 feet from portal to portal. The estimated cost is \$2,650,000.

Give Us Fresh Air.

Mr. S. F. Covington, who was called to preside over the meeting held on Saturday evening last, called to consider the question of improving Deer creek valley, said:

"Cincinnati was more densely populated than any city in the country. The population of this city was about 36,000 to the square mile; New York, the next most populous city, had 32,000 to the square mile. Cincinnati had about 58 persons to the square acre, London had 40, Edinburg 40, and Dublin 32.

We had in this city about 1,400 tenement houses, containing about 16,000 rooms, in which were domiciled 10,000 families, aggregating between 38,000 and 40,000 persons. There were 4,200 families in this city occupying only one room each, aggregating 16,000 persons. This state of facts must necessarily result in disease and suffering and crime. It was the duty of the philanthropist, of every man, to use his best efforts to diffuse the population. The territory of the city should be enlarged, and every facility should be afforded the people of this overcrowded city to get where they could breathe the pure air of heaven. He hoped that street railroads, affording cheap fare, might be built upon every street leading out of the city. The people who were thus overcrowded were the men whose industry was building up the city, and it was the duty of the rich, those who had the accumulated wealth, to aid them in securing more comforts and better health."

Precisely. The territory of the city should be enlarged, or, in other words, some rapid, cheap and certain method should be devised to diffuse our overcrowded population over what is known as the upper plain of our city.

Unless this is done, we would like to know how our city is to grow. Shall we go on until we number fifty, sixty thousand people to the square acre? This will not do. Shall we fill up the places opposite us in Kentucky? This is an inconvenient and but a small relief. No, we must get out into the glorious plain that lays north of us, and this we can do best by means of railways, narrow gauge and inclined, and those now passing out by way of the river lines, and Mill creek; but above and beyond all others by means of the Deer creek tunnel. There will be business enough for them all, and there need be no jealousies with old interests of new projects that are devised for the city's growth.

If once our pent-up population breaks loose and begins to flow into the healthy and beautiful valley northward, there will be no such thing as stopping it until a larger settlement will be formed there than is now included in the area of our city defined by the Ohio river upon the one side, and the semicircle of the Walnut hills. Such opportunities will not only draw our present numbers down to a healthy and reasonable limit, but it will afford such advantages for our city's growth that it will show a progress at the next national census that will restore its lost prestige, and again place her in the honorable position of the Queen City of the West.

If this tunnel was built, and trains were running through it, so as to convey people a distance of ten or twelve miles into the country, to and from the city, every half hour, and at low rates, it would not be long before this entrance would be used even with a quadruple track, to its utmost capacity, and there would be a demand for other tunnels through the hills, or a very great enlargement of the present one. The settlement of a hundred thousand people upon the upper plain, with such facilities, is only a question of a few years, and a decade or two more with such a nucleus will find the larger part of the city there, and the question then presented, as it now is in New York, how shall we get from one extremity of the city to the other quick enough, cheap enough, and sure enough, to meet our wants?

To some this may seem extravagant. So it would have appeared for New York twenty-five or even ten years ago, but now it is a problem that must and will be solved, though it require an outlay of an hundred million of dollars. The Viaduct Railway will, doubtless, be made, and enormous as its capacity will be it will only serve a section of the great city, and other roads of the same character or of some better one will have to be made before the demand will be met.

If our city is to grow, there can be no doubt about the nature and extent of our wants in these particulars. If it is *not*, then all efforts to construct these works is a wicked waste of raw material, and we may as well fence it in and let it thicken up to any extent it can or pleases. There is no use bothering about Deer creek or Mill creek either.

But we are not of those who think Cincinnati is finished, or "will grow imperceptibly," as a paper in a rival western city suggests. We are confident that she will grow rapidly until she will include in her corporate limits six hundred thousand souls, and after that slowly and perceptibly until she includes a million. There is no reason in the world why she will not thus advance. We are not making comparisons with the future of other cities, they will grow too, but we claim for our own city this progress because of her geographical position, the character and extent of country, and the vast and varied resources contained therein, which are directly tributary to her.

If we are right, or even half right in these conjectures, who does not see that all sorts of means of communication must be had between the upper and lower portions of the city, and that such facilities must be among the most profitable investments that can be had; they will be certain, regular, and increasing with the growth of the city and the wealth of its people. When this condition of things shall be reached, the million of dollars used for the completion of the present Walnut hills tunnel will be worth more than any million ever yet invested in Cincinnati.

The Indianapolis Junction Railroad to pass into the hands of the Cincinnati, Hamilton & Dayton.

FULL TERMS OF THE CONTRACT BETWEEN THE PARTIES.

For some time it has been understood that the officers of these roads have been considering the propriety of effecting the contract, the particulars of which we give below.

These facts being settled, it now only remains for the stockholders of the respective companies to signify their approval, when the Indianapolis interest will pass under the vigorous management of the Cincinnati, Hamilton & Dayton company.

The status of the Indianapolis company, upon which this arrangement was made, is as follows:

It is incumbered by a first mortgage to secure \$1,200,000, a second for \$800,000, and a third for \$800,000 yet to be issued. It owes a floating debt of about \$1,000,000, and has issued a preferred stock of over \$1,000,000. Its equipment is estimated at \$300,000.

The contract is substantially the following:

1. That the Junction Railroad Company shall transfer and deliver to this company, as owner, a majority of its common stock and \$500,000 of the preferred stock, so as to give the Cincinnati, Hamilton & Dayton Railroad Company the ownership and control of its corporate organization and property.

2. That the Cincinnati, Hamilton & Dayton Railroad Company shall then, by means of that corporate organization, and not as lessee, operate the road, in connection with its own, to the best advantage.

3. That the Cincinnati, Hamilton & Dayton Railroad Company shall advance its notes to the amount of \$500,000, payable in one, two, three, four and five years in equal installments, with interest at seven per cent per annum, payable annually, as a loan, with which assistance the Junction Railroad Company is to retire and extinguish the entire floating debt, before the contract takes effect.

4. This loan is to be repaid, principal and interest, out of the net earnings of the road, after payment of interest on the first and second mortgage bonds, and the entire issue (\$800,000) of the third mortgage bonds is to be placed in the custody of this company as collateral security therefor.

5. The coupons on \$600,000 of the second mortgage bonds, up to and including those falling due September 1, 1874, are to be cut off and canceled, so that until March 1, 1875, no payments, on account of interest on bonds, will have to be made beyond \$98,000 per annum.

6. But the C., H. & D. company is not in any way to assume any liability for the Junction Railroad Company, nor guarantee the payment of any of its obligations, principal or interest.

— The Lexington Observer and Reporter says: "It is authoritatively announced that General Breckinridge has withdrawn his proposition to the counties of Boyd and Carter for subscriptions to the capital stock of the Big Sandy road. He expresses the opinion that the plan for the early completion of the road will fail, unless the good people of those counties come down sympathetically with a handsome subscription. Gen. B. is now in Charleston, W. Va."

Rockport and Cincinnati Railroad.

E. H. Sabin, the General Superintendent of the above named road, has been for some time gathering statistics to show the value of his scheme and its importance to Cincinnati.

That he has done his work thoroughly is shown by his elaborate report published in our city dailies on the 5th inst., and from which we condense the following:

TRIBUTARY TO THE ROAD.

Square miles.....	5,990
Number of acres of improved land.....	1,482,953
Number of acres unimproved land.....	2,125,873
Number of acres of timber land.....	2,125,873
Total value of lands at a low est.....	\$50,782,644
Number of bushels of corn.....	8,266,145
“ of bushels of wheat.....	1,875,585
“ of pounds of tobacco.....	40,544,970
“ of horses.....	64,977
“ of mules.....	16,315
“ of cattle.....	151,635
“ of hogs.....	645,232
“ of sheep.....	88,000
“ of pounds of wool.....	259,000
Total population.....	207,311

The earning power of the road is based upon whatever there is in over 5,000 square miles of contributing country, of over 2,000,000 acres of land valued at over \$50,000,000, yielding over 8,000,000 bushels of corn, over 40,000,000 pounds of tobacco and more than 500,000 hogs, with a fair average of all other agricultural products to furnish a profitable tonnage for the road, we certainly have it. And there are in this district 2,125,873 acres of unimproved land yet to be brought into cultivation and made tributary to the line of road as well as to the commerce of this city.

Speaking of the mineral wealth of the country through which this road is to pass he says:

"Prof. E. T. Cox, state geologist of Indiana, in a letter to me says: 'You are probably aware that the block coal of Indiana is the most valuable fuel in the world for manufacturing iron and steel. For locomotive use, and for all other purposes except the manufacture of gas, it is likewise unequalled. The block coal of this State is attracting more attention at this time than any other mineral in the United States.'"

"Prof. J. S. Newberry, chief geologist of Ohio, says in his report: 'Nearly all the iron used in the world at the present time is manufactured with mineral fuel. * * * A little more than thirty years ago it will be seen that raw coal as a furnace fuel was then advanced as a new and wonderful discovery.'"

"This 'raw coal,' as it is termed, adapted to the iron business without the coking process, is found in great abundance on and near the line of our railroad, and by its use a large per cent. may be saved in the manufacture of iron."

Prof. E. T. Cox, geologist of the State of Indiana, justly remarks in his report:

"Next to agriculture, coal and iron form the basis of a nation's wealth. England today owes her greatness as a nation more to the coal fields that lie within her borders than to any other cause. Without cheap fuel what would become of her vast workshops that have made her mistress of the markets of the world? * * * But England is now in the zenith of her manufacturing strength; her warehouses are filled with goods and all the markets of the world are glutted with the pro-

ducts of her skill and enterprise. Still, with her vastly superior natural resources, America can look ahead to the time when the failing coal fields of England will mark the decline in her manufactures and place the former in the ascendancy."

"Overlooked as south-west Indiana has been, with her almost exhaustless general and block coal supply, she will yet contribute her share to the improvement and development of the iron manufacturing interest in the West—of which Cincinnati may and ought to be the center—that we must yet reach in our race of successful competition.

"Claiming that the block coal of south-west Indiana is equal in quality and quantity to that found in Clay county, Indiana, (and daily shipped to Chicago and St. Louis, and other manufacturing cities,) it is fair to present statistics from that county as illustrative of what may be done in Duhois and Spencer in the same line. I quote from Prof. Cox's report: 'The following is an exhibit of the quantity and value of block coal and bituminous coking coals mined daily in Clay county:

Block coal shipped daily from Clay county, 410 tons, valued at \$2 50 per ton.....	\$1,023
Block coal used daily in blast furnaces in Clay county, 300 tons at \$2 50 per ton.....	750
Bituminous coking coal mined daily in Clay Co., 60 tons, at \$2	120
Block coal mined daily in Clay county, 710 tons at \$2 50 per ton.....	1,775
Total tons of coal mined daily in Clay county.....	770
Total value.....	\$1,895
Approximate yield for one year, 230,000 tons; value.....	\$366,000

"I submit another illustration giving the approximate earnings of the road in the shipment of coal. I take them from the actual figures of one coal hank on a western railroad whose market facilities are not equal to what ours will be, and based on bituminous coal alone.

"It is this: Forty car loads of 350 hushels each per day, making 14,000 hushels or 538 tons, at the moderate rate of 78 cents per ton; making a daily earning of \$420, or \$126,000 per annum.

"I submit one more fact. Four miles from Rockport in a sugar-loaf shaped hill, was what was called the "Kroh coal hank." From two mines, using wagons and a tram railroad for transportation, they used frequently to sell and ship from the hank of the river at Rockport 25,000 bushels of coal per day, to steamboats and for shipment south."

The Sup't says:

"The lumber trade must form a profitable source of revenue to the road. When it is remembered that there are 2,125,873 acres of timber on and near the line of road, timber of superior quality—oak, walnut, poplar and hickory—the reason for this assertion is quite apparent. To a city as largely engaged in the manufacture of articles in which wood is the 'raw material,' this is an important consideration.

"Agricultural products vary with full or short crops. But not so of coal and lumber. We have these two now staple articles to secure us a uniform and never failing source of revenue.

"Taken altogether, gentlemen, you have invested your money in a reasonable and feasible railroad enterprise, and one that from its geographical route and valuable connections must be highly promotive of the material prosperity of your city."

Personal.

We learn that our esteemed friend, Mr. John W. Brown, is appointed General Passenger and Ticket Agent of the Indianapolis, Bloomington & Western Railway, vice N. E. Scott, Esq., resigned.

This is a first-class appointment, as Mr. Brown is popular throughout the west, possesses large experience in his business, and is in every way qualified for the duties he has assumed, however extensive they may be.

He has our best wishes for his success.

All communications relating to the passenger business of this road should be addressed to him at Urbana, Illinois.

Sensible—very.

The *Commercial* of the 8th inst says:

"If it really is desirable or necessary to improve Deer creek valley, would it not be well to consider the economical advantages of the completion of the tunnel, and do what may be within the province of our municipal authority to encourage the location of railroad depots and warehouses there. No better place can be found for the establishment of a great railroad center."

And

"If the people want the lots of private citizens located in Deer creek valley improved, let them encourage the completion of the tunnel, in order that they may get their land cheaply from the howels of the earth."

The Metropolitan Underground Railway.

This line, which was recently extended from Blackfriars to Cannon street, was incorporated by Parliament in 1854, and on January 10, 1863, the line was opened for travel from Paddington to Farringdon street by a public dinner, on which occasion Hon. Robert Lowe, now Chancellor of the Exchequer, made a humorous but practical speech, and predicted that in a short time the line would form a nucleus of what might become a circle connecting all the great railways running into London. In 1864 another company was formed to run on an inner circle, and so great has been the popularity of the underground railways, that in 1870 there were carried over these routes 39,160,849 passengers. The original line was increased every year by the addition of short links, and the recent addition has extended the road to within two minutes' walk of the Bank of England. The construction of the terminus and the approach to it for a distance of 840 feet, was commenced about the end of March, and since that time 2,000 men have been employed night and day upon the work. In building the tunnel, vaults 12 feet deep, with two adjacent subways, were discovered under Queen Victoria street, and to carry the line under these passages, two tiers of wrought iron girders had to be used, the lower tier supporting the subways and the upper tier bearing the roadway of the street. At another a perfect passage, 20 feet wide, with a pointed arched roof, built of square chalk, with roughly molded ribs, was discovered. Houses were standing on the arch, which is believed to be a work of the 14th century, and also to be a portion of an underground passage running down to the Thames.

The Blue Ridge Railroad.

Some weeks ago it was announced in these columns that arrangements were then progressing for an effective programme looking to the early completion of this great enterprise, so long cherished by the people of this State. The consummation of these arrangements are now made public. The State stock in the Blue Ridge Railroad has been purchased by an association of gentlemen, embracing leading citizens and influential capitalists of this State, together with persons of ample means and influence in New York. This stock has been transferred upon the condition that the State shall be protected from loss upon the \$4,000,000 guaranteed bonds, and that the road shall be completed within five years from the date of transfer. The sum agreed to be paid for the stock is merely nominal it is true, but the new company amply reimburses the State by affording protection from any loss upon the State guarantee, and by rapid completion of the enterprise. Besides, it is agreed that the State shall receive \$10,000 per annum for five years after the completion of the road, as a further payment for the stock now transferred. We are not at liberty, perhaps, to mention the names of gentlemen forming this new company, but we can assure the public that many of our most honored and respected citizens are included in this combination of capital and influence, as will be acknowledged when the transfer is entirely made and their names are given to the world.

The plan for the completion of the road is to change the gauge to three feet, and surveys will be commenced without delay to make the contemplated alteration. It is believed that the narrow gauge, as it is termed, will answer every purpose for the most extensive business and traffic ever claimed for this road. The subject has been thoroughly matured, and all the sources of information exhaustively explored with a view to the proposed change. The facilities for meeting the demands of trade and commerce are confidently expected to prove adequate under the narrow gauge system, while the lessened expenses of construction and the low cost of operating the road when completed, afford the strongest inducements for a trial of this system which is attracting so much attention throughout the civilized world. In proof of the assertion that this plan has been carefully considered, we will state that Col. James P. Low, Chief Engineer of the Blue Ridge Railroad, has in press an elaborate report on the subject of narrow gauge railways, in which the system is thoroughly discussed and its merits and demerits explained. The adaptation of the three foot gauge to the wants of commerce in this State is reduced to an absolute certainty by facts and figures. The report will likewise contain valuable information and interesting statistics concerning the Blue Ridge Railroad, and we shall look for its publication with anxiety—*Anderson Intelligencer*.

For the purpose of coating fabrics and tissues with metal, such as copper, silver and gold, the material is first to be impregnated with a solution of sulphate of copper, in ammonia, and then dried. After drying the whole is immersed in a warm solution of grape sugar, which develops oxide of copper, upon which silver or gold can be electroplated in the usual way.

The City of Baltimore and its Great Railroad.

A late number of the *Baltimore Gazette* speaking of the change of gauge upon the Ohio & Mississippi road, says:

"The New York and Erie Railroad and the Atlantic and Great Western, broad gauge roads, which were absolutely dependent upon this road for their Mississippi connections, by it lost a large and most important portion of their trunk line. The Ohio and Mississippi road, which was a New York road, becomes a Baltimore one, and a great feeder to New York is suddenly diverted to a rival city. This is what this change of gauge means. We must recollect that this great work has not been accomplished by Baltimore, but chiefly by New York capital and enterprise, and that Mr. Aspinwall and Mr. Torrance and other New York capitalists, who, with the aid of the Baltimore & Ohio road, have pushed this matter through and invested so much capital in it are New York men who are fully convinced that the great natural advantages offered by this city, aided by its extended and extending railway connections, must make it soon a successful competitor with New York.

"To Baltimore this connection with St. Louis is what the landing at San Salvador was to Columbus, what the discovery of the Mississippi was to De Soto. It is the accomplishment of a great work, after many years of long and weary voyaging. We started for the Ohio and reached there after many a tedious and costly struggle, to find, after all, that we had nothing but a local coal road, and that the miles of heavy, costly work through the desert of West Virginia did not even pay profit enough on the investment to provide grease for the engine wheels. We bought a road to Cincinnati and spent hundreds of thousands of dollars on repairs and equipment, and laid out another million on a bridge over the Ohio, merely to find that without feeders from the far West, we could not expect to earn the interest on the mortgage bonds of the Ohio road.

"From to-day dates a new era in the commerce and trade of this city. The Baltimore & Ohio road, the Marietta & Cincinnati road, the Baltimore & Cincinnati road, a small independent and very necessary link, affording direct communication with Cincinnati, to be completed by December next, and the Ohio and Mississippi road, now form virtually one line of unbroken railway, the shortest and quickest between the cities of the Ohio and Mississippi Valleys and those of the Atlantic seaboard. Within a week one thousand new fast freight cars of uniform gauge will be placed on the new line for through business. The roads west of the Mississippi, as well as the roads in Indiana, Illinois and Kentucky, which could not before connect with this line on account of the difference of gauge, now become feeders to it, and a vast amount of freight which hitherto had no outlet here will soon come pouring in, arriving at our wharves without break of bulk.

"Anticipating the great results which are to flow from this connection, and satisfied from his past experience of the capacity of Baltimore to maintain ocean steamship lines, Mr. Allan has already announced to his agents here that he has fixed the days for the sailing of Liverpool steamers from this port every four weeks up to the month of December, after which time he proposes to start a semi-monthly line. With proper encouragement given to the large business which will offer,

and the capital which will seek investment here, even this will not afford sufficient accommodation for the foreign trade of Baltimore. Baltimore is now the natural port of entry on the Atlantic seaboard for Cincinnati, St. Louis, Louisville, Nashville, Memphis and other great trade centers of the West and Southwest. Already two cargoes, one of fruit from the Mediterranean and one of sugars from the West Indies have been ordered here for St. Louis by a house which hitherto has always imported via New Orleans. This is but a beginning. All we want, now that we have opened means of communication to our city, is to induce the active business men of the country who have been in the habit of trading with New York and New Orleans, to come here and see and appreciate what we really have to offer them."

The Union Pacific Railroad.

The building of the road across the continent has passed into history as the great and most impressive event of our railway building era. Built and in operation now more than two years—the road still presents the great administrative problem of the day. That problem is, how to secure the development of the country immediately tributary to the line, and how at once to operate at a profit and raise to the rank of paying investments the securities of a road upon which as a national enterprise the people have claims so strong and just. To the working out of this result the best administrative abilities of our day are devoting themselves, under the direction and largely in the person of Mr. Thomas A. Scott.

Immediately on Colonel Scott's election to the Presidency of the Union Pacific Railroad, the *Review* was able to inform its readers of the purpose of the new President, responding to the desire of the owners of the road, to devote thereto a very large share of his personal attention. Setting out with the purpose of securing the utmost economy consistent with entire efficiency, the new administration have, in the face of a material decrease in earnings, operated the road at a profit. In one word, during the five months ending May 31, the ratio of expenses to earnings has been reduced from seventy-six per cent. in 1870, to fifty-two and one-half per cent. in 1871, as shown in the following table received from the office of the company:

	May, 1870	May, 1871.
Earnings	\$802,586 09	\$724,466 51
Operating exp...	476,090 61	264,955 51
Taxes paid.....	3,550 00	80,394 33
Net earnings...	\$322,945 48	\$379,116 17
	Jan. 1 to May 31, 1870.	Jan. 1 to May 31, 1871.
Earnings	\$3,051,466 08	\$2,682,110 24
Operating exp...	2,285,383 19	1,319,987 26
Taxes paid.....	35,302 69	87,777 71
Net earnings...	\$730,780 20	\$1,274,345 71
During the first five months of 1871, earnings were less than in 1870.....		\$369,355 84
Expenses.....		912,921 35
Net earnings larger.....		\$543,565 51

Ratio of expenses to earnings:

Five months of 1870.....	76
Five months of 1871.....	52½

Narrow Gauge.

Mr. R. H. Lamborn of Philadelphia, writes under date of July 15th:—The old war of the gauges has been opened again. The contest in which the 7 feet, the 6 feet, the 5 feet 6 inches, the 5 feet, the 4 feet 10 inches, and the 4 feet 8½ inches were pitted against each other, has by the same sure process of natural selection resulted in the almost universal adoption of the last named and narrowest gauge.

The advocates of the three feet gauge claim that in the majority of instances in which railroads have been and are to be built in the United States, the stockholders would be better remunerated and the community at large accommodated more thoroughly and at lower rates for freight and passage were three feet used instead of the now wide gauge of four feet eight and a half inches.

They claim that the whole United States will ultimately be overspread by a network of local narrow gauge roads, which will be emphatically the people's roads, and which will pour their freight and passengers into great trunk lines leading to the prominent centers of trade.

They claim that there are mountain communities where the people must for decades remain without railroads if the broad gauge is retained, but into which narrow gauge roads can be built for sums that can readily be commanded; that the sparse populations of our great mining and grazing Territories must for many years depend upon a few main East and West trunk lines and expensive wagon transportation unless a cheap gauge is adopted which will enable them to build long local branches at small cost; that villages and country communities by thousands in the districts controlled by lines yet to be built, must, in case the broad gauge is retained, exist without the advantages of local roads for a generation longer, unless the new and cheap machine—the narrow gauge road—is adopted in its stead. Therefore, would it not be well for stockholders and bondholders before spending their money in laying another rail upon the ponderous broad gauge plan to pause and gravely consider the merits of the new and cheaper system? Would it not be wise for legislators forthwith to encourage by proper laws a contrivance which promises so much benefit to the great masses of their constituents? and is it not due to the people who so generously assisted the corporations that are to-day determining the gauge for scores of years and for hundreds of thousands of new roads in our vast trans-Mississippi empire, that the plan best adapted for the early and ultimate accommodation of the entire community shall be adopted and maintained?

THE POST OFFICE.—The business at the Post Office continues steadily to increase. The report of the foreign department shows that during the quarter ending June 30, 1871, 1,651,841 letters were sent, of which number 881,192 were British, 530,036 were sent by the Bremen and Hamburg and North German Union Lines combined, and 5,205 to France direct. During the same time 1,566,995 letters were received, of which 830,622 were British, 499,346 came by the German lines, and 2,520 from France direct. The grand total of letters sent and received were 3,218,836.

A recent live stock census of Great Britain shows 9,235,052 cattle, 82,787,788 sheep and lambs, and 3,950,730 pigs.

Our Railroads.

To give some idea of the magnitude of this interest in the United States, the following figures are given: In 1830 there were but 23 miles of railroad in the United States; in 1840 there were 2,818 miles; in 1850 there were 9,021 miles. In the latter year their earnings were about \$40,000,000, nearly equally derived from passengers and freight. In 1860 there were 30,635 miles in operation, while in 1870 their length had increased to 53,399 miles. In the former year the State of Ohio had the greatest length of railroad lines, being 2,947 miles. Illinois was second, with 2,917 miles; Pennsylvania third, with 2,802 miles; and New York fourth, with 2,700 miles. The assessed valuation of all the railroads in the United States, in 1870, was \$14,334,343,475, being an increase in ten years of over \$2,000,000,000.

The increase of the earnings of the railroads of the country will, of course, show an equally striking progress. For example, in 1850, with 9,000 miles of road, the earnings from passengers and freight were about \$40,000,000, while in 1870, with 53,400 miles, the earnings were \$450,000,000, or nearly \$9,000 per mile, an increase of \$20,000,000 annually for the past 20 years.

The total tonnage of all the railroads in 1850 was about 5,000,000 tons, while in 1870 the total tonnage was about 100,000,000 tons. The total tonnage actually transported in 1870 was 72,500,000 tons, which, at a fair estimate of current rates for transportation, say \$150 per ton, would give a gross value of \$10,875,750,000, being an annual average increase in the last 20 years of \$503,267,740.

To illustrate in the most forcible manner the interest which the people have in the vast system of railways, it is only necessary to say that this immense increase in the traffic has been brought about solely by the great reduction in the cost of transportation. Were railway rates the same as those by the old means of transportation, their construction would never have progressed beyond the neighborhood of great cities. For illustration, the cost of transporting a ton of corn over the old-fashioned routes was equal to 20 cents per mile. The cost of carrying it to a market town 125 miles from the place of its production would, therefore, consume its value in freight. Therefore the grain of the vast plantations of the Western States would have no value outside of a radius of 125 miles, and the necessary result would be that there would be very little production. Upon a railroad, with the cost of transportation reduced from 20 cents per ton per mile, to 1 and 1½ cents per ton per mile, the radius within which corn can be marketed with profit is increased from 125 miles to 1,600. The circle described by the radius of 125 miles contains but 49,087 square miles, a territory but little larger than the State of New York, while the circle described by the radius of 1,600 miles contains 8,042,406 square miles, or a territory two and two-thirds times as large as the entire area of all the States and Territories of the United States.

There is still another very interesting view of the progress of our railroad traffic, which may serve to illustrate their general importance to the entire people—that is, their progressive earnings per capita of population. For instance, in 1840 their earnings were 49 cents per head; in 1850 they were \$1 55 per head; in 1860 they were \$4 90 per head, and in 1870 they were \$10 per head. Is it too much to say that such proportionate increase

of earnings affords the most accurate measure of the rapid growth of our industrial resources and commerce, and that it is due in the greatest measure to the construction and successful management of our railroads?

In the domestic economy of our entire people, there is nothing which possesses a tithe of the importance of our system of railways. They furnish a market at every man's door for all his varied products. The farmer upon the prairies watered by the Platte river can ship his corn or his beef to the New York market with less difficulty than his father in New England forty years ago carried his little product to the market town. Wherever they are built the value of all labor is enhanced, and the laboring man is almost sure to find remunerative employment.

The future of the railway system of this country is difficult to foresee. The increase of construction is most likely to continue with equal rapidity for many years to come in the same proportion as in the past twenty years. Something will depend on our increase of population, but as that is steadily and rapidly increasing, and as the same population, leaving out of the account any increase, will double their traffic every ten years, the construction must go on with undiminished vigor for some years, even in the older settled States where the increase of population is comparatively slow. Some estimate of what may occur in the future can be made when it is shown that the State of Massachusetts has one mile of railway to every 5.27 mile of territory. The same proportion would give New York about 9,000 miles, Pennsylvania the same, Ohio nearly 8,000, and Illinois about 11,000 miles. There is no reason we can imagine why the construction of roads in each of the States named should not progress until they shall have reached the same proportion with Massachusetts. In this way it is very easy to imagine the existence, not many years in the future, of a system of railroads in the United States, aggregating 100,000 miles, and doubtless even then the same necessity will be experienced as now for the construction of other lines.—*Commercial*

IMPORTATIONS OF BREADSTUFFS INTO GREAT BRITAIN.—The London *Times* of the 10th says: It appears that our wheat importations during the half year just ended have amounted to 14,753,558 cwt., valued at £8,717,736, against 13,843,124 cwt., valued at £6,777,696 in the corresponding half of last year. Of other grain the value has been £5,673,004, against £5,945,242, and of flour it has been £1,780,121 against £1,638,201. The total cost of our supplies has therefore been £16,170,861, showing an increase of £1,809,722, or about 12½ per cent. over that for the same six months of 1870. The sources whence our wheat importations have been derived are: Russia, 40 per cent.; America, 38 per cent.; Germany, 9 per cent.; Canada, 5 per cent.; Turkey, 4 per cent.; Austria, 1 per cent.; Chili, 1 per cent.; and other countries 2 per cent. Compared with the first half of each of the preceding two years Russia and Canada figure for a large increase, while Germany shows a decrease. The United States show a decrease from last year, but a large increase on 1869.

The total circulation of the national banks is stated at \$318,686,999.

During last year 940,000,000 letters passed through the post offices of Great Britain, and of the whole number only 27,000 were alleged to be lost.

Pacific Railway Through Business.

The San Francisco *Bulletin* publishes a detailed review of the trade of that city for the first six months of the present year.

The merchandise exports show the smallest aggregate seen for five years. The exhibit is more apparent than real, however. The decrease is partly due to the diversion of east bound freight in favor of the railroad. The total decline of \$1,200,000 shipments by water in two years is compensated for by the fact that goods to this value have been sent to New York by railroad in the periods named.

The *Bulletin's* tables do not show June business of the Pacific roads. The following shows the items of freight (in pounds) shipped from San Francisco to the Atlantic States by this route, during the first five months:

	Pounds.
Base hullion.....	28,350
Coffee.....	168,040
Cotton.....	88,986
Firearms.....	14,970
Fish.....	74,773
Glue.....	65,185
Hides.....	22,896
Hops.....	78,081
Leather.....	764,354
Oil.....	42,187
Quicksilver.....	40,950
Silk.....	292,276
Spices.....	27,450
Straw hats.....	8,528
Tea.....	2,465,019
Whalebone.....	8,649
Wine.....	780,630
Wool.....	7,493,391
Mdse.....	3,675,067
Total.....	16,137,787

During this period the passengers by railway numbered:

Arrived.....	11,548
Departed.....	8,108
Total.....	19,656

The arrivals and departures by sea during the entire six months, amounted to 10,907. In other words the Pacific roads carried twice as many passengers as took vessel to all parts of the world. Panama passengers numbered 4,149—1,704 arriving, 2,445 departing.

—The railroad from Vera Cruz to the city of Mexico, according to a recent report of the engineers, is completed for a distance of 186 miles, leaving 110 miles yet to be opened, the length of the entire line, including a branch to Puebla. The gross receipts during 1870, on the part of the line from the city of Mexico to Puebla, a distance of 116 miles, amounted to \$667,000, and the receipts on the line from Vera Cruz to Paso del Macho, a distance of 47 miles, amounted to \$197,170. During 1870 the passengers carried from Mexico to Puebla were 118,990 in number. The chief obstacle to the completion of this line has been the great Methlac ravine, a natural fissure of formidable dimensions, which is 900 feet long and 870 feet deep. At first it was proposed to cross this ravine by constructing a viaduct, but after a resurvey a plan was adopted by which the road is to run along the cliff of the ravine for some distance, until it reaches a spot where the fissure can be bridged by a work of comparatively insignificant dimensions.

Narrow and Broad Gauge Railways.

There seems to be a variety of opinion with engineers and railway managers, in reference to the most suitable gauge for railways in the United States, some advocating the narrow gauge, others the medium (4 ft. 8½ in.), while many are decidedly in favor of the broad gauge (6 ft.). But the whole thing can be taken in at a glance by any practical man, let him be an engineer, or hewer of wood, or a delver of the earth, viz: different localities require different gauges. For instance, the railway now building from here to Danbury should not be over a three foot gauge, for such a road would cost but little over one-half as much to build, equip and run for the next ten years, as the 4 ft. 8½ in. road would cost, which in ten years would be a saving of at least two millions of dollars in investment, interest and economy in running, and would do all the business that possibly could be offered in the above named time. The ties, at the end of ten years, would be rotten and would have to be replaced; the iron or steel could be taken up and used in building branches to the various lateral villages which, in that time, would naturally spring up, and the narrow gauge could be replaced by a 4 ft. 8½ in.; while in the meantime the transportation of material could be done by the narrow gauge preparatory for laying the broad gauge, much cheaper than by horses and carts.

The great objection urged by the opponents of the narrow gauge, is the reshipment of freight, which is a mere bagatelle compared to the immense saving which, probably, on a fair computation would not be over one-eighth or one-tenth of the amount saved. In other words, if a 4 ft. 8½ in. would pay 7 per cent. per annum for the ten years, the narrow gauge would, for the same time, pay 40 or 50 per cent. Therefore, as well might you, Mr. Editor, have an elephant to draw a horse's load, or a giant to do a boy's work, as to build broad gauge roads where narrow gauge will do as well. In the meantime, I will merely add, that there are some localities near our large cities, which will, in a short time, for comfort and economy, require much broader gauges than ever yet has been introduced in this or any other country, the detailed plan of which I will give you in your next issue; a road that will be free from dust and cinders, a traveling palace, which will be comparatively free from noise; in which lectures, concerts, or political speeches can be given to five or six hundred persons who are comfortably and pleasantly flying over the earth with entire safety, at the rate of 30 or 40 miles per hour; a road that will accommodate the multitude of people living in the city of New York, at less than half the rates now charged, yet will be highly remunerative to the stockholders, and be the great breathing artery for our noble metropolis—*Cor. Port Chester (N. Y.) Journal.*

—The Dubuque *Herald* says that within the distance of five miles of Dubuque not less than three-quarters of a million of dollars will have been expended before the first day of January, 1872, on the Chicago, Dubuque & Minnesota Railroad. The Iowa & Pacific road—now an assured success—which will intersect this road at some point near the junction with the Central, will open up the rich treasures of the Turkey valley. And this thoroughfare, too, will demand substantial and permanent character on the part of its powerful ally, earlier in the field—the C., D. & M. road.

BALTIMORE AND OHIO EXTENSION TO CHICAGO.—It is known that the engineers of the Baltimore and Ohio Railroad are now engaged in surveying a direct route for the extension of their road from Pittsburg to Chicago, and that when the route is finally determined upon it will be built without delay. The survey is completed, we are informed, from Pittsburg to Havana, a small station on the Lake Erie Division of the Baltimore and Ohio Railway, eight miles south of Monroeville, Ohio. From thence it is expected, according to the programme now being pursued, the line will run to Defiance on the Toledo, Wabash and Western Railway, crossing on its way the Dayton and Michigan Railway at a point now called Ellsworth. If we are rightly informed the engineers are now at work on this part of the line. From Defiance it is expected that the engineers will work their way along the Bryan and through Lagrange and Steuben counties to Laporte. This route is being pursued under the impression that distance is saved sufficient to atone for a loss of advantages offered by one passing through Toledo.—*Toledo Blade.*

RIVER AND RAIL TRANSPORTATION.—The New Orleans *Picayune* publishes a statement in which it says: "It will be seen that about fifteen per cent. of all the produce sent South from St. Louis comes via the Iron Mountain road. If the figures for the Illinois Central, the O. & M. road and the two roads to Indianapolis could be ascertained, they would show, no doubt, that at least twenty-five per cent. of the Southern bound freight from the West has abandoned the river route.

"The shipments South from Louisville and Cincinnati would beyond doubt show a decided preponderance in favor of the railroad. Even as bulky an article as tobacco comes through to New Orleans from the former place nearly the whole season as cheaply by rail as by river, and sometimes more cheaply.

"The river route has not been able to compete with the railroads across the country to the seaboard, and it is even falling behind in the competition with longitudinal roads, and this is the case with both up and down freights. Several cargoes of coffee have this season gone through Mobile, and thence West by the Iron Mountain road. Freight and insurance considered that is the cheapest route for a St. Louis merchant to import coffee by."

—Several narrow gauge railroads are projected in Pennsylvania. A company has been chartered to build a road of 30 inches gauge from Philadelphia, to connect with the Pennsylvania Central in Chester county, passing through Upper Darby, Hereford, Maple, Newtown and Paoli. In a week or two, work will be begun on another narrow gauge road from Bell's Mills station, on the Pennsylvania Central, in Blair county, across the Allegheny mountains through Bell's gap, a distance of 12 miles, which will afford an outlet for the coal, lumber and iron of an important mountain district. Some of the gradients on this line will be over 100 feet to the mile. The Lancaster & Reading Narrow Gauge Railroad Company has been incorporated, with the right to build a road with a gauge not exceeding 4 feet, from the city of Reading; also to construct branches. There is also a movement on foot to build a narrow gauge road from Media to Chester, in Delaware county.

—The Illinois Central Railroad earned in the month of June, \$739,939 18, an increase over 1870 of \$27,342 55. The land sales amounted to \$66,350.

Iron as an Element of Civilization.

Probably the truest standard by which to measure the value of an article, is to consider the need that existed for it at the time of its discovery, the uses that can be made of it, and the position in which a given form of civilization, or any essential portion thereof, would find itself if it were to lack an element necessary to its progress—an element the need of which might be felt while the element itself could not be supplied. Necessity stimulates the spirit of discovery; and it is a part of the immutable and exact economy of nature that one of the most useful and profitable results of discovery is to create wants in connection with and inseparable from every thing of value that has ever been developed, whether from latent principles into practical systems, or from formless masses into articles that serve practical ends. When civilization had so far advanced that mankind required houses to live in, huts and cabins were first made to satisfy this want; and when the artistic faculty which expresses itself in architectural design was combined with the domestic taste and the wealth that exacted more beautiful and more commodious dwelling-places than could be wrought from earth-mounds, stone was found to be an improvement for the purpose on any other material that had hitherto been known. With the increase of the population and the tendency of people to aggregate in large cities, stone was found to be too scarce and too unwieldy for the multi-form needs of the people and the rapidity with which their interests demanded that it should be handled. The necessity for a substitute for stone for many of the objects to which it had been applied suggested the possibility of making artificial stone, and bricks were accordingly invented. Then the principle of making artificial stone was amplified and refined, and through slow degrees chinaware, porcelain and kindred substances of utility and ornament were produced. So of all others of the useful and beautiful inventions and discoveries by which the world has been benefited. The want of them, though frequently undefined, was felt; and the means of supplying the want were discovered and applied. Then the supply, growing in excess of the demand, reacted and, showing its adaptability to create wants by its own worthiness and to supersede inferior materials, established a sphere of its own, created and multiplied new industries, and was thus the means of promoting human welfare and of advancing civilization.

There are many of the constituent forces of the great whole of inanimate nature that, when discovered and developed, have contributed to found true material civilization; and, so vast and manifold have been the objects to which they could be applied, that not only has civilization been wholly unable to outgrow the need of them, but the farther it advanced the more absolutely it required them. Among these constituent portions of the semper utile we may name gold, silver and copper. We do not wish to slight the claims of these articles of multi-form utility when we claim for iron an extent of utility that surpasses that of gold, silver and copper combined. So far as these three metals serve as the representatives of money they accomplish a useful purpose; but civilization would by no means retrograde if they were withdrawn. As regards their services to the other requirements of civilization, satisfactory substitutes have been found for them in a majority of instances. But for iron the world knows no perfect substitute. Other metals may in some instances be advantageously used in lieu of it; but for absolute material utility, in the most comprehensive sphere, on the largest and most solid scale, and as applicable to the greatest number of what may be called the uses of detail, iron stands pre-em-

nent above any other one of the mineral products of nature.

The great superiority of iron over other metals in such portions of both the light and heavy work of the world as must be performed by metal consists in the fact of its combining the qualities of malleability and durability in a degree in which no other metal combines them. (In this connection we leave platinum out of account, since the mine of it discovered in Siberia some years since has been exhausted.) Iron may be either cast or wrought, and it is susceptible of being tempered to the lowest degree of softness in which a hard metal need be used, and it can be tempered also to a degree of hardness that will bore—as in the case of the Alps tunnel—through flint. It can be cast, rolled or molded into any conceivable form, and in its product, steel, can be ground to the finest edge. Concerning the uses to which iron has been put, it would require columns simply to name them. If the circumstance could arise in which the world should be called upon to say which of the great metals it must necessarily discard, iron would doubtless be the one it would retain in preference to any other, and perhaps to all others, since no other possesses such universal applicability. None other is at once so cheap, so plentiful, so varied in its usefulness, and so lasting. It has superseded wood as the material for building ships, whether of sail or steam. For architectural design it is equal to stone or wood, while it is known to be cheaper, and it is believed to be more durable as a building material when kept properly painted. There is nothing for metallic uses between a needle and steam hammer—between a locomotive and a pen-knife blade—that can not be made at less cost and of more lasting quality from iron than from any other metal.

If to stamp its name upon a great age be an honor to a metal, which, of all the metals, has a post of honor like that of iron? Among different peoples, and through successive ages, when literature and the high arts flourished contemporaneously with the poverty of the masses—in other words, when railroads and steamships were unknown—when gold was money and coins were few—each of the great epochs of nations was called their "golden age." But iron has supplanted gold in poetry as well as in fact. In this epoch of civil and religious liberty, of general prosperity, diffused education, large wages and large fortunes, we say that we live in the iron age.—*New York Paper.*

NARROW GAUGE IN SOUTH-WESTERN PENNSYLVANIA.—There is much interest in Fayette county in regard to the proposed narrow gauge road from Fairchance to Greene county, to go through on the coal level to the Monongahela river, in order to open up the coke, coal, lumber and ore interest. From present indications it will be built. The Uniontown *Genius* thinks the day is not far distant when Fairchance will be the center of several narrow gauge roads, all feeders to the Uniontown and West Virginia Railroad.—*Pittsburg Commercial.*

The receipts of coin and bullion at San Francisco during the three months ending 30th ult., reached \$11,545,894, of which \$4,165,209 was in silver bullion, \$4,999,638 in gold dust and bars, and \$2,381,047 in coin. Included in the total for the quarter was \$442,486 in coin from Mexico, and \$60,666 in silver bullion; the remainder was from California and Nevada. The remittances of coin from San Francisco, by railroad, during the same period, were \$2,456,690, very nearly equally divided between gold and silver—all except \$7,200 shipped in June.

RAILROAD NOTICE.

The Cincinnati & Great Northern Railroad Company.

The undersigned Corporators of the Cincinnati & Great Northern Railroad Company hereby give notice that Books of Subscription to the capital stock of said Company will be opened at the office of the Railroad Record, No. 167 Walnut street, Cincinnati, Ohio, on Saturday, the 26th day of August next, at 11 o'clock, A. M., of said day, and continue open at the same place each day thereafter (Sundays excepted), until stock is subscribed sufficient to organize said Company, and as much longer as said Corporators may direct.

A. J. HODDER,
DURBIN WARD,
T. WRIGHTSON,
S. W. MORTON,
ROBT. HEDGER,

Corporators.

CINCINNATI, July 27th, 1871.

7-30 GOLD LOAN.

OF THE

Northern Pacific Railroad

RAPID PROGRESS OF THE WORK.

The building of the Northern Pacific Railroad, (begun July last), is being pushed forward with great energy from both extremities of the line. Several thousand men are employed in Minnesota and on the Pacific coast. The grade is nearly completed 266 miles westward from Lake Superior; trains are running over 130 miles of finished road, and track laying is rapidly progressing toward the eastern border of Dakota. Including its purchase of the St. Paul & Pacific Road, the Northern Pacific Company now has 413 miles of completed road, and by September next this will be increased to at least 560.

A Good Investment. Jay Cooke & Co. are now selling, and unhesitatingly recommend as a Profitable and perfectly Safe investment, the First Mortgage Land Grant Gold Bonds of the Northern Pacific Railroad Company. They have 30 years to run, bear Seven and Three-Tenths percent. gold interest (more than 8 per cent. currency) and are secured by first and only mortgage on the ENTIRE ROAD AND ITS EQUIPMENTS, and also, as fast as the Road is completed, on

23,000 Acres of Land to every mile of track, or 500 Acres for each \$1,000 Bond. They are exempt from U. S. Tax; Principal and Interest are payable in Gold; Denominations: Coupons, \$100 to \$1,000; Registered, \$100 to \$10,000.

Lands for Bonds. Northern Pacific 7-30's are at all times receivable at TEN PER CENT. ABOVE PAR, in exchange for the Company's Lands, at their lowest cash price. This renders them practically INTEREST BEARING LAND WARRANTS.

Sinking Fund. The proceeds of all sales of Lands are required to be devoted to the repurchase and cancellation of the First Mortgage Bonds of the Company. The Land Grant of the Road exceeds Fifty Million Acres. This immense Sinking Fund will undoubtedly cancel the principal of the Company's bonded debt before it falls due. With their ample security and high rate of interest, there is no investment, accessible to the people, which is more PROFITABLE OR SAFE.

Exchanging U. S. Five-Twenties. The success of the New Government 5 per cent. Loan will compel the early surrender of United States 6 per cents. Many holders of Five-Twenties are now exchanging them for Northern Pacific Seven-Thirties, thus realizing a handsome profit, and greatly increasing their yearly income.

Other Securities.—All marketable Stocks and Bonds will be received at their highest current price in exchange for Northern Pacific Seven-Thirties. EXPRESS CHARGES on Money or Bonds received, and on Seven-Thirties sent in return will be paid by the Financial Agents. Full information, maps, pamphlets, &c., can be obtained on application at any agency, or from the undersigned.

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CHARLES A. DANA, Editor.

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The Railroad Record.

E. D. MANSFIELD, - - - - } Editors
T. W. WRIGHTSON, - - - - }
A. J. HODDER, - - - - }

CINCINNATI, - - THURSDAY, AUGUST 17, 1871

The Railroad Record,

PUBLISHED EVERY THURSDAY MORNING,

By Wrightson & Co.,

OFFICE—No. 167 Walnut Street

SUBSCRIPTIONS—\$3 per annum in advance.

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Kentucky & Great Eastern Railroad.

A short time ago the papers announced the organization of this company, without saying what course its road was to take, or what it was intended to do, and as the name did not indicate these facts the public were left in the dark, until a city cotemporary a short time afterwards announced that this new organization was made for the purpose of constructing another east and west railroad, which will be shorter in actual distance by more than a hundred miles than any of the present railway thoroughfares leading from this city to New York, and by reason of easy grades and favorable alignment a further gain of at least fifty miles.

This news was somewhat startling to the railway men of the country, and brought forth considerable discussion in the newspapers upon the possibility of saving so many miles in actual distance, as well as that of crossing the Alleghenies upon grades materially less than those of the Baltimore & Ohio and Pennsylvania Central roads.

We believe it was generally conceded that there was much more in this scheme than was at first sight apparent, and that although there might not be so great a saving of distance as was claimed, yet there would be enough to warrant the construction of the road.

We now have a report from the president of the company, S. W. Morton, of New York, in which he sets out very succinctly, and with great clearness, under what legal authority the Kentucky & Great Eastern is called into existence, the objects of the company, the

local and general merits of the proposed road, its advantages as an arterial line, the arrangements already made by which northern and north-western connections will be had, the cost of building and equipping the line, and the profits that will arise from its earnings.

We can not do better, in an attempt to convey to our readers the claims of this enterprise, than to copy from the report itself.

Speaking of the charter under which this company is organized, the president says:

The Kentucky & Great Eastern Railway Company, a corporation duly organized under a special charter granted by the State of Kentucky, which authorizes the construction of a railway from the cities of Newport or Covington, Ky., to any point within the State, and with the right to construct branch roads from the main line from and to any point that may be desired, and branches from the branches, giving to all these branches the same rights and powers as are enjoyed by the main stem. It also authorizes the company to buy, lease, consolidate with or subscribe to the capital stock of any other railway, in or out of the State of Kentucky, and to obtain county and municipal aid towards the construction of the road; also exempt the property of the company from State, county or municipal taxation, until the road is completed and in full operation.

This is a remarkable extent of authority. Such a charter reminds us of the old privileges that used to be granted by State legislatures, when they knew little or nothing of the powers into which a corporation, feeble as it was in its beginning, might grow. At such times almost anything in the way of a charter for a joint stock company could be had for the asking; since then, it has been and still is part of the business of the legislatures of these same States to devise ways and means to check the growth and influence of the creatures once so encouraged and favored.

This charter is an improvement, so far as the corporate interests are concerned, over most of the old ones of which we have spoken. It satisfies the modern wants of a railway company, that are extravagant in comparison with those of earlier days, and enables it to do, with every advantage to itself, all that an enthusiastic advocate of corporate rights could require. In some of our older States, where railroad companies have been long in operation, such a charter would be worth a very large sum of money; in a few years this one will be equally as valuable, and another time it impossible to obtain, even from the generous State of Kentucky.

The present object of the company, and the course of the road, is announced in the report as follows:

The object of the Company, for the present, is to make a new line of railway, by consolidation and otherwise, from the principal business centers of the south-western interior States, such as Cincinnati, St. Louis, Louisville, Memphis, etc., through a section of country full of natural resources, to tide-water at the city of New York, affording equally advantageous connections with other

large cities of the Atlantic seaboard, that will be shorter by a sufficient number of miles to command the business of these points and the adjacent country, of easier grades, and at a much less cost than either of the present great East and West railway thoroughfares.

It is proposed to commence such a line at Newport or Covington, Ky., opposite the city of Cincinnati, at which points connections now exist with St. Louis and Louisville; from thence running upon the Southern bank of the Ohio river above high water mark to the Big Sandy river, where connections are made with the Chesapeake & Ohio Railroad, and the interior towns of Virginia, and the cities of Richmond and Norfolk; thence it will pass to the western line of the State of West Virginia, through which State it will be continued, by special charter already granted, upon the table lands of the mountains that divide the waters of the Kanawha and Monongahela; thence by special charters across the States of Virginia and Maryland, and through the south-east corner of the State of Pennsylvania to the State of New Jersey; thence by running arrangement or consolidation over roads already constructed across the State of New Jersey to the city of New York. The whole distance from the city of Cincinnati being *six hundred and forty miles*, with maximum grades going east from Cincinnati to Carleburgh, one hundred and thirty miles of *fifteen feet* to the mile; from Carleburgh east one hundred and forty miles, *twenty six feet* to the mile; and the next one hundred and thirty-eight miles of *fifty-two feet* to the mile.

This remarkable showing gives this route the advantage of *two hundred and forty miles* over the present longest road (the New York Central) between this city and New York, and *one hundred and six miles* over that of the Panhandle, which is the present shortest line between these cities, besides the further advantages of superior grades and curvature.

The report claims also, that the location of this line gives it such connection with all the leading business centres upon each side of it, that it is as good a route in distance, and better in time, from Cincinnati to Washington city and Baltimore, than the lines now in operation between these places. And it is the best route from the South-west to Philadelphia, Boston, and all points in the New England States, as a glance at the map will at once show.

President Morton says his road will be the centre of a belt of country of unsurpassed industrial resources, which contains *eighteen thousand square miles*, and that lies in a latitude of so mild and uniform a temperature, that the road will be relieved from the inconveniences of snow and frost that so severely affect the more northern routes. And that there is contained within this belt an unsurpassed agricultural country, now under a high state of improvement, and the very heart of the iron and coal region of North-eastern Kentucky, the immense cannel and bituminous coal deposits, mineral, salt and oil springs of the Kanawha region of West Virginia, the extensive gas bearing coal fields of the upper Monongahela, and the most densely popula-

ted section of South-eastern Pennsylvania. It also passes through the localities of the finest and most accessible beds of slate, lime and sand-stone, and forests of the most valuable hard wood and pine species, such as are in constant and increasing demand in the cities of the seaboard, as well as the lower river country.


The cost of the work thoroughly built and equipped is given at \$17,430,000—and the earning power at the opening of the road is estimated at \$8,466,000, and sixty five per centum of gross receipts is computed for operating expenses.

To such of our readers as may compare the cost of constructing this work with that of the mountain roads in existence, this estimate will seem unreasonably low. We were so impressed when the line was first defined to us, but an examination of the surveys will convince the most skeptical that it is high enough. It is indeed a most remarkable route across the mountains, altogether better than either of the present roads, and we believe the best that can be found.

Attached to this report is a correct and clear map, gotten up by Bogart & Stillman of this city, showing the relative position this road will hold to that of others leading from the interior to tidewater, and the connections it will make with the lake region of the north-west, and the river country of the south-west. And there is also appended a copy of this charter of which we have already spoken.

Mr. Morton has our thanks for not encumbering his report with intricate tables taken from the last census report, showing all the lumbering statistics of each precinct near or through which his road is to pass, and for omitting certified analyses of the coal and iron and oil and other mineral products that will go to make up the business of his road, and for not boring us with the opinions of "eminent tourists," and long editorial effusions upon the merits of his undertaking. If these ever were valuable in such reports they have long since ceased to be so. Few persons read such statements, and a less number study them enough to understand them.

President Morton drives straight at his work, opens at the beginning, and follows it through by sectional divisions, so that he has conveyed to us, in the briefest and clearest way possible, as much information concerning his scheme as can be obtained from a report concerning it. And having given it to us in good large type, clearly cut upon fine tinted paper, he has secured its reading by all into whose hands it may fall, and who can possibly have the least interest in such an enterprise.

 The latest revised tables at the Census office show the following aggregate of population of all the States and organized Territories: White, 33,536,630; colored, 4,879,323; Indian, 70,783; Japanese, 55; Chinese, 63,196; total, 38,549,987.

What we want.

If we had a man belonging to our city who possessed wealth, experience, and the character and influence that success in business gives, and who was devoted to the growth of our city, we would have the means of doing a great deal for our city's good that we have not now, and for which we are suffering.

To such an individual various schemes of great public interest would be presented, and if they were of sufficient merit to command his respect and attention they would be secure of that examination necessary to develop their advantages, and a support that would ensure their success.

For want of these many a good project comes still-born into our midst, or is undertaken with such feeble support as to linger and languish without producing its full benefits to any one for many years, if at all, and many an energetic man, full of skill and genius, has taken himself off to some more congenial locality, and given other interests the advantages of thoughts and schemes which we had not discovered, or if so, had not encouraged.

Such a man was the Hon. James Guthrie, of Louisville, and is Mr. Ogden, of Chicago, and George Law, Cyrus W. Field, Peter Cooper and Commodore Vanderbilt, of New York.

The writer was at an interview with one of the above named gentlemen when a scheme for an improvement valuable to the city in which he lived was presented and discussed. All efforts to interest leading men, or even to secure the aid of the press of that city except as paid advertising, had failed before this. The subject was considered—the distinguished gentleman required a few days to reflect upon the subject, after which time he expressed his approbation of it, and so signified to a few leading gentlemen of the place; this secured a candid conference, and a critical examination into the merits of the undertaking—the press awoke to its importance, and spoke out strongly and continuously. In the main it was adopted, and has been one of the most valuable adjuncts to that city's prosperity.

This is not the only case we could cite, and if we should enumerate valuable inventions, and well matured and truly scientific schemes that have been suspended for years, and revived with great results, or driven away from where they were first proffered to the world, we should fill a small volume.

The importance, therefore, of such an oracle, so to speak, will we think be conceded by every one, and the further fact, that we are, just now at any rate, without such a blessing, will doubtless be as generally acknowledged.

The question naturally arises then, What shall we do about it? How shall we supply this want in our social and commercial polity? We can't very well get up the man in time for much good in this generation. And there

are fears that he might do as other promising individuals have done with us, that is, as soon as he becomes rich, become exclusive, shut himself up in his shell, do nothing, and imagine himself abused by the people because not appreciated by them at his own estimated worth. Or he may feel himself too large for the place, and go off to New York or some of the great European cities to spend the balance of his life. Something of this sort has befallen our city for the past twenty years, and may again. It will not do, therefore, to wait for the coming man, but attempt to supply his place by the organization of smaller men into a body, that shall be well regulated, and more efficient in such matters than any single individual can be.

In some places trade and commercial organizations attempt to meet this demand, and sometimes do so in a satisfactory manner. But we think it will hardly be claimed that either our Chamber of Commerce—substantial and respectable as it is—or our more recently created Board of Trade—serviceable as it may be to the business interests of the city—are supplying this want with us.

No, what we want is a society of the leading gentlemen of our city, who shall convene at stated periods, in some properly appointed place, there to discuss and duly consider all questions of a public nature touching the interests of the city, and after they have been deliberated upon, give them such support as they merit, and devise such ways and means as may be within their power to render them successful. Such a body of men would be highly intellectual and wonderfully suggestive, as well as a power that would not only promote the healthy growth and development of our municipal interests, but thwart the schemes of rings and organizations formed only for plunder.

To such a society would be presented all railway projects desiring individual or corporate aid, bridge questions, parks, river interests, municipal buildings, city improvements, &c.; and such an association of gentlemen would entertain persons from other sections of the country, who visit us with a view to making valuable improvements, or capitalists who might be seeking investments, and who by reason of the authentic information thus obtained, and the good offices of such a society, would be induced to connect their interests with our own.

We can conceive a number of ways in which such a body would be likely to contribute to the public weal, but as we only expected at this time to call attention to this matter, we leave it for further development, and we hope for the aid of other pens.

These thoughts were prompted by a recent conversation with an eminent lawyer of this city, who has felt this same public want as we have, and who had before seriously thought of attempting the organization of a club for the

purpose of relieving it. He had expressed his ideas to other leading citizens of our city, who also approved of it. Here is a nucleus for the society of which we speak. Who will move in it, and have the honor of being its founder? It is capable of, and would doubtless soon become one of the most creditable, useful and substantial bodies of the city.

Ohio River Bridges.

On Saturday last, the Pennsylvania Central Railroad Company completed the purchase of a large majority of the stock of the Jeffersonville, Madison & Indianapolis Railroad and branches, and also of the Louisville bridge that spans the Ohio river; and Thomas Scott was at once elected president of both companies.

Thus the Pennsylvania Railroad Company adds to its already enormous possessions, and secures the control of the railroad bridge across the Ohio river at Louisville, as it has that of the railroad river bridge at this city. All through lines, therefore, between the two great sections of the country must pay tribute for crossing the Ohio river to this great corporation, or build new bridges.

The country grows, and the Pennsylvania Central follows it closely.

Personal.

We received a call last Saturday from Judge McKemy, of Dayton.

The Judge has been canvassing the northern part of Darke county in the interests of the Cincinnati & Great Northern Railroad, and reports satisfactory progress in the work.

Judge McKemy is deservedly popular in that part of the State, and is an energetic and most efficient canvasser. If there is any come-out to the people there, he will find it.

The Babcock Fire Extinguisher.

MEMPHIS & CHARLESTON R. R.
SUPERINTENDENT'S OFFICE,
MEMPHIS, Tenn., March 28, 1870.

F. W. FARWELL, Secretary,

Dear Sir:—The day after purchasing the fifty Fire Extinguishers from your company, we had an opportunity of practically testing their value.

A box car, containing twenty-six bales of cotton, was discovered to be on fire, and although convenient to a hydrant, with hose attached and playing upon the fire, the water apparently had no effect. One of your Fire Extinguishers was brought into requisition, and the fire completely subdued in one minute.

I consider them invaluable, and all depots and railroad trains should be provided with them.

Very truly yours,

W. J. Ross,

Gen'l Sup't M. & C. R. R.

GOOD NEWS FROM MERCER COUNTY.—We were informed this morning that Mercer county had raised \$42,000 towards the Cincinnati & Great Northern Railroad, and that by Saturday night next her full quota, \$50,000, will be secured.

This speaks well for the people up there. They deserve to get out of the woods and we believe before long they will.

When we read a few days ago that the ladies of Celina were engaged in the canvass, we were ready to bet our "bottom dollar" that the railroad would win.

Railway Wrongs.

There is considerable in the complaint made by a New York paper under the above head, that it behooves our railroad men to consider. Such things will not be allowed to go on very long. The great and overpowering principle of compensation comes in and regulates these things, and the sooner this is recognized and acted upon the better.

A wise management will foresee the inevitable and anticipate it.

It says:

"From the first the public accepted them [sleeping and palace coaches] enthusiastically when prices seemed reasonable. But what was designed as a luxury the managers seem determined should be a necessity, and the public have no choice. *Gradually the comfortable cars heretofore employed for way travel were discontinued, or became so few in number that no choice remained but a seat in the palace, or sleeping car, at a price that all travelers were not able to afford.* Generally on through trains one smoking car, with a coach, a bare remove from an emigrant accommodation, was offered to those who declined the high-priced comforts of the palace coach. In the common car, aside from the bad ventilation, the passenger is denied the cheap luxury of a civil answer, and half the time the convenience of a seat. For through travel, and for those who can afford it, the palace car is an unquestionable advantage; but there is no reason why the ordinary passenger coach should not be at least as comfortable as before the introduction of the former."

WEBSTER'S CALENDAR is the title of an almanac just received, published by JOEL MUNSSELL, Esq., Albany, N. Y. It is the standard—and deservedly so—almanac for a large section of country around Albany. It has been published now for eighty-nine years consecutively, and for the last twenty five years by the present publisher. The issue for '72 fully sustains the reputation of its predecessors, and evinces the fact that although our old friend MUNSSELL is not as young as he used to be when first we knew the calendar, yet it has lost nothing of the vivacity of youth, but is rather enriched by his ripening years. We trust that he may live to issue not only the centenary of Webster's Calendar but go at least a "half better."

The Deer Creek Valley.

The Commoner of last week has a long and able article upon the above question, from which we take the liberty of condensing the following:

"It is not enough to declare the valley a nuisance, that must be abated, and resolve to do it by mere resolution of the Council, without specification of the ways and means. How much work, and what kind of work it would require; who shall do it and how it must be paid for, and what other conditions belong to the subject, must be diligently enquired into, before the great task is to be undertaken. There are many reasons why the agitation should commence now, and be thoroughly conducted. There is the sanitary reason; there is the railroad reason; there is the highway reason, and the economical reason if the improvement has eventually to be made, that it should be done at once when the property can be had at a fair price. Still, it will not do for us to plunge into so vast an enterprise without the previous report of experts who will fully and intelligently examine the whole subject. There are three ideas of considerable consequence that ought to be observed if the city is to handle the improvement of the valley. First, that the property to be purchased or leased, shall be bought or hired at a fair price. Deer creek property, we are aware under exceptional circumstances, has brought high prices, as in the case of the Roman nose. There should not be any repetition of that speculation by Council, nor by a jury assessing damages. Next, it seems to us, that the criminal labor of the city, and probably the county, so far as it is able-bodied, should be put down into suitable enclosures in the valley and be lodged and fed there, and compelled to work with the pick and shovel. A few desperate offenders might be sent to Columbus, but all the rest, by law, should be compelled to work on the Deer creek improvement.

Next, we think that the valley should be prepared for its obvious destiny of a railroad center for many tracks, and for spacious freight depots, and indeed for the other business incidental to railroads. The eastern and southern roads will all save not only in distance but in speed, by going through the "Tunnel," which must be completed soon by private enterprise. A score of tracks will be necessary, and they should be laid straight through the middle, with open daylight overhead. Near the hill on each side of the valley, but at a suitable distance, depots, stone buildings should be commenced so that they could be arched over the top, and extended up and down, and out towards the tracks, to be lighted from the front, and likewise with gas. These structures should be firm, and they can be so made from stone at hand, and with lime and sand and dirt from the spot, and brought there by the railroads. Such depot buildings will be useful and suitable, and could be distributed according to the railroads demand. The "tunnel" folks should deposit their excavation over the whole valley, and by that, and dirt obtained from the nearest stone quarries and other sources, the creek bed could be filled up, and raised and leveled so as to be as dry and extensive as desirable.

The Commoner then asks the very pertinent question; "How shall the cost be paid?" and answers by saying:

"The Commoner has always contended that such charges should be distributed; and paid

first by the property bounding upon it, which to some extent will be benefited more than other property. The old rule was to go to the extraordinary limit of fifty per cent.; but the better judgment of the legislature has reduced that one-half, or to twenty five per cent. The landowners on the border will be benefited, and they should pay for it. Evidently, the railroads can afford to pay liberally for the extraordinary advantages that will accrue to them and they should be all made to contribute their share to the actual cost, besides paying rent for special depot and other accommodations.

It will be observed that instead of one surface to sell or let, there will be two equally available for different purposes. The lower level would be mostly if not altogether for the railroads. The upper level would be made by filling out into the valley over the tops of the stone arches; and this could be permanently improved, like any other part of the city, by houses and shops and stores. Paris and Rome are cities constructed upon such foundations to an incredible extent; and their structures are of the most massive and imposing character. The Back Bay at Boston, beyond the Common, was filled up by a commission, and land enough reclaimed to pay millions of money more than the expense. We have been told that it paid the State debt."

The above are valuable suggestions, that our thinking men would do well to consider. Out of them something valuable and practicable may grow, and a plan be devised that shall secure the reclamation of this unsightly and unwholesome part of our city to one of the most valuable and beautiful sections.

The question is up now; let it be thoroughly discussed, and all the light possible obtained upon the best means to accomplish this devoutly to be wished result.

Ironton, Portsmouth & Cincinnati Railroad.

COMPLETION OF THE SURVEYS FROM CINCINNATI TO PORTSMOUTH.

The corrective survey of the Ironton, Portsmouth & Cincinnati Railroad has been completed. This, it will be remembered, is one of the proposed roads from this city to a point of intersection with the Chesapeake & Ohio Railroad, now approaching completion from Norfolk, Virginia, to the mouth of Big Sandy.

The surveys, accompanied by profiles, estimates, &c., will be placed before the officers of the Chesapeake & Ohio road at an early period.

According to this survey, it appears the distance from Columbia (eastern suburb of Cincinnati) is from 92 to 93 miles, which, it is claimed, can be reduced to 90 miles. The maximum grade is only 35 feet, while the curvatures are easy. The tunneling required will be, in the aggregate, but 600 feet. Through Clermont and Brown counties, a distance of 54 miles, it is about a straight line, with few bridges and culverts of an expensive character.

Benn Kline, Esq., chairman of the committee on survey, says of the route:

The grading will not, it is considered, cost over one million dollars, which amount, it is not unreasonable to suppose, can be secured along the route of the road, including Ports-

mouth and Cincinnati subscriptions, and the right of way, without cost to the company.

It is believed that the merits of this route, above all others, will commend it to the favorable action and co-operation of the Chesapeake & Ohio Railroad Company, when they come to a final determination to reach Cincinnati as an objective point for their western and south-western connections, and it is unnecessary to expatiate lengthily upon the advantages of this railroad enterprise to the citizens of Scioto, Adams, Brown, Clermont and Hamilton counties, Cincinnati included, as they are well understood and appreciated and will, I trust, be fully acted up to when the enterprise shall be fully inaugurated, and the proper time comes for action, with the purpose of putting it through.

The Railways of the United States.

Mr. Poor, in his valuable Manual, gives the following figures:

The number of miles constructed in the decade ending in 1840, was 3,513; in that ending with 1850, 5,508, in that ending with 1860, 21,614; and in that ending with 1870, 22,764. The greatest number of miles constructed in any one year was in that just passed, in which 6,145 miles were opened. The mileage constructed in 1869 and 1870 equaled 11,144 miles. The progress of railroads, as will be seen by reference to accompanying tables, was seriously interrupted by the war of secession. During the four years of its continuance, only 3,273 miles were opened—2,872 miles less than were opened during the past year. In that period only a very small extent of mileage was constructed in the Southern States. Within the past two years, great progress has been made in these works in that section of country.

The total earnings of the 50,000 miles of railroads in operation in the United States the past year, at \$9,000 per mile of line, equaled \$450,000,000. The increase in 20 years equaled \$4,000,000, or \$20,000,000 annually.

At the rate of traffic upon the railways of Massachusetts, New York, and Pennsylvania, the amount upon the 50,000 miles in operation throughout the country would be more than 30,000,000 tons. The tonnage of the railroads of the other States will not come up to the average of those named. The average tonnage for the whole can not, however, be less than 2,500 tons to the mile. Such a rate, for all our roads, assuming the average mileage in operation for the year to be 50,000 miles, would give an aggregate of 125,000,000 tons. From this aggregate, however, must be deducted duplicated tonnage—or tonnage passing over more than one road, estimated at 30,000,000 tons. The net quantity would, therefore, equal 95,000,000 tons.

Reckoning the value of the tonnage at \$150 per ton, and deducting 22,500,000 tons for the low priced freight, coal and minerals, and the value of the merchandise tonnage of all our roads—to wit, 72,500,000 tons—gives a gross value of \$10,875,750,000.

The tonnage transported by the railroads in 1851 equaled 5,000,000. In 1870 the net tonnage equaled 72,500,000 tons; the increase of tonnage in a period of 20 years equaled 67,500,000, or at the rate of 3,375,000 yearly. The value of the railroad tonnage transported in 1851, at \$150 per ton, equaled \$810,750,000. In 1870 its value, at \$150 per ton, equaled \$10,875,750,000. The total increase of value in this period of twenty years equaled \$10,065,000,000. The annual increase of value equaled \$503,267,740.

The Cincinnati, Hamilton & Dayton Railroad.

It Enters Upon a New and Enlarged Field—The Contract by Which it is to Reach Fort Wayne and Penetrate Michigan.

The close business observer need hardly to be informed that the Cincinnati, Hamilton & Dayton railroad has of late been considering plans and taking steps that can not fail to be of great consequence to the future interests of that road. Accepting as a foregone conclusion that another road was to be constructed between this city and Dayton, which was, at any rate, from the peculiar situation of affairs, but a natural consequence the energy which had been used from time to time to delay that event, directed by a business sagacity which was able to turn a little temporary loss to a larger gain, has been actively employed in an effort to extend the business influence of this sterling road, and to provide for it in the future tributaries that can not fail to be to it never failing sources of business.

A few days ago we spoke particularly of the contract which had been entered into between the officers of this road, and the approval of the board of directors, and the officers of the Cincinnati & Indianapolis Junction railroad, running from Hamilton to Indianapolis, by which, if the same be ratified by the stockholders, the latter road will pass under the control of the Cincinnati, Hamilton & Dayton railroad, thus giving the latter an independent and continuous road from this city to Indianapolis, a distance of 124 miles. At the latter place, with the admirable system of railroads radiating in all directions into the State of Indiana, as well as penetrating Illinois and States still further west, opportunities of close business connections if nothing more will present themselves, thus opening up to the C H & D R. R. and to Cincinnati a territory and a trade of which no turn in railroad affairs can deprive them.

But another step was taken prior to this, to which persons aside from those immediately interested have given little attention. It is a contract entered into between the Cincinnati, Hamilton & Dayton Railroad Company; Cincinnati, Richmond & Fort Wayne Railroad Company; Grand Rapids & Indiana Railroad Company, and the Pennsylvania Company, by which the Cincinnati, Hamilton & Dayton, Grand Rapids & Indiana and Pennsylvania Companies are to extend aid to the fourth road now constructing between Richmond and Fort Wayne by which the Cincinnati, Hamilton & Dayton Railroad is to have certain advantages at Fort Wayne and between that city and Richmond, while from Fort Wayne northwardly they are to have the benefits of the Cincinnati business that is to pass over the Grand Rapids & Indiana Railroad, which is now in process of construction through the State of Michigan. The Cincinnati, Richmond & Fort Wayne Railroad, now constructing between Richmond and Fort Wayne, a distance of about ninety miles, will be finished within one year. The Cincinnati, Hamilton & Dayton Railroad already has a road to Richmond, so that it will reach Fort Wayne, on the completion of the new road, by a direct line.

At Fort Wayne the new road connects with the Pittsburg, Fort Wayne & Chicago Railway, now operated and controlled by the aforesaid Pennsylvania company, and with the Grand Rapids & Indiana road.

The terms of the contract may be stated in brief as follows:

1. A lease of the road from Richmond to Fort Wayne, when finished, to the Grand Rapids & Indiana Railroad Company, for the term of fifty years, at the actual cost of running it.

2. A mutual contract between all the parties for an exchange of business by the line thus formed, giving to the Cincinnati, Hamilton & Dayton Railroad Company an exclusive right to the business of the new road and of the Grand Rapids & Indiana road, to and from, and by way of Cincinnati.

3. A provision by which the new line is to be supplied with machinery and rolling stock by the three other companies in equal proportions, for which an allowance of ten per cent per annum on the appraised value thereof is to be made and charged as part of the running expenses, the property so contributed, however, to remain the joint property of the parties furnishing it.

4. The three companies, so using the Richmond & Fort Wayne road, also, agree that in case in any year the net earnings of the road shall be insufficient to pay the interest, at seven per cent, on one million eight hundred thousand dollars of bonds issued for its construction, they will jointly and in equal proportion, contribute the amount of the deficiency, to be repaid, with interest, out of the future earnings of the road.

The Grand Rapids & Indiana Railroad is to extend from Fort Wayne to Little Traverse Bay in the upper part of the State of Michigan, and from the latter point, will, of course, be constructed to Mackinaw, a distance of comparatively few miles. This road is now finished through the State of Indiana, and through the State of Michigan is well on its destination. A month ago the road was running to Paris, in Michigan, and the section of twenty miles north of that place was ready for the iron. The contract for grading forty miles additional has been let, and when this is completed but forty miles will remain to complete the road to Great Traverse Bay. —Gazette.

Michigan may well point with pride to its school buildings, scattered all over the State. Battle Creek has just completed an \$81,000 school house. Other places, for the same purpose, have invested as follows: Fenton, \$40,000; Grand Haven, \$40,000; Bry Cir, \$100,000; Portage, Houghton county, \$34,000; village of Mason, \$22,000; Niles, \$75,000; Marshall, \$100,000; Hinsdale, \$52,000; Ionia, \$30,000; Kalamazoo, \$100,000; Grand Rapids \$150,000; Adrian, \$155,000; Howell, \$35,000; Holv, \$27,000; Corunna, \$30,000; Owosso, \$54,000; Port Huron, \$75,000; Constantine, \$34,000; Sturgis, \$30,000; Paw Paw, \$45,000; Ypsilanti, \$84,000; Wyandotte, \$40,000.

A great improvement in electro plating has recently been made. Upon the surface of sheets of polished brass, tin, copper, steel, or iron, of the requisite dimensions, the letters and numbers of the sign are laid off and covered with asphaltum, black varnish, or any paint or material that will resist the acids used in electro-plating. The sheets thus prepared are covered with a coat of nickel or silver plating, leaving the letters intact, and not plated; then the signs are hurried, which removes the paint, leaving the letters depressed below the plating. They can be painted to suit the taste, or if upon brass or copper, can be left without coloring.

The Narrow Gauge Question.

WHAT IS A "FIRST-CLASS" ROAD.

The merits and demerits, the expediency or inexpediency, of narrow gauges, have become the most prominent, because the most important problem of the day in railway economy. The question: What constitutes a first class railway? is about to be brought to the attention of our Government in constructing the contracts made with "Pacific" railways, wherein that term is used or implied.

Is a "narrow gauge" a "first-class" railway?

We have received from Hon. W. D. Mann—a practical railway man and executive officer of an extended railway intimately connected with the Texas Pacific route—a copy of a letter addressed by him to the Secretary of the Interior which treats this subject in an exhaustive and able manner. We regret that we cannot give the letter entire. We condense its contents, presenting the more important points:

Mr. Mann understands—as has been reported in the newspapers—that the Texas Pacific Railroad favors the 3 ft. gauge; and it is presumed they will ask the approval of it of Government as a compliance with the condition of their grant requiring a "first-class" road. To the success of the whole railway system of the South-west, it is of paramount importance that the gauge of all roads should be uniform, and should be that which most nearly meets all the conditions and demands of that section. Comparatively, few roads are built in the South-west of the Mississippi; they are mostly on a 5 ft. 6 in. gauge, now generally admitted to be too wide for economy. Their gauge will be changed; and will, like new roads to be made, take their gauge from the Texas Pacific. Whether then the future system of south-western railways shall enjoy the success which an economical gauge contributes towards, depends on the action of the Texas Pacific company—and that will, likely, depend on the decision of the Government as to what is a first-class road. The writer defines a first class railway as one which most securely, rapidly, economically, and satisfactorily accomplishes the traffic falling to it, the particular gauge of its track being immaterial, so that these points are secured. If it is true that prevailing gauges are too wide for economical operation, they can hardly be called first-class roads, at least under the above definition; and accordingly Mr. Mann addresses himself to this question, and we shall present his views entire, though in a condensed form.

To determine what constitutes such a road two considerations are presented: First, the traffic likely to fall to it; second, whether a proposed road will accomplish it safely, rapidly, economically, and satisfactorily. To illustrate: The Festiniog Railway in Wales (much cited by narrow gauge advocates) may safely, etc., accomplish its traffic, viz: the transportation for a short distance, of iron, coal, etc., and passengers. Hence it would be a first-class road in its place, while such a road might utterly fail in accomplishing the traffic of the Texas Pacific Railroad—the transportation of live stock, cotton, and light but bulky freights over great distances. Coal, iron, etc., may be concentrated and economically carried on very narrow cars, and passengers may cheerfully sit cramped up in double seats to ride an hour or so, as on the Festiniog Railway; but they must have width of car enough for ease of movement and sleeping when on a trip across a continent!

It is claimed for the Texas Pacific Railroad that, owing to a shorter distance, superior climate, etc., it will naturally take the mass of trans-continental passengers. For this very reason no road on that line will be first-class which does not from its gauge furnish cars of comfortable width. The transportation of live stock and Government animals will necessarily be a large share of its business in all the future. No road for that line will be first-class which can not safely and comfortably transport live animals, cotton, etc., economically. The angle of stability must be preserved in constructing cars. As said before, on a very narrow gauge road, this may be maintained in coal cars and cars for iron, etc.; but to carry live stock the cars must have a certain width,—must be wide enough to place them athwart the car, on account of oscillation under motion. Engineers agree that with the average railways, to admit of a fair speed, no car should be constructed with a width, over a 1, greater than twice the width of gauge. It is true that if lowered considerably nearer the track than is now done the cars might be two and a quarter times the width of the gauge. The boldest engineer would not recommend more than $2\frac{1}{2}$ times the gauge width for the car. Cars for carrying live stock safely and economically must have a minimum width of 8 feet in the clear, for even if they can safely be carried longitudinally with the car they can not be economically stowed in narrow cars. It is doubtful if comfortable through passenger coaches can be constructed with much less width than 8 feet.

These facts admitted, no road can be first-class on the Texas Pacific line which can not run cars of 8 feet in width, thus requiring a gauge of 4 feet. A passenger coach, it is claimed, may be made comfortable at 7 feet wide, but even this should have a 4 ft. gauge, as a car carrying passengers and involving human life should really never be twice the width of the track gauge. It is possible that by placing the body of cars as low as practicable they may be built to accommodate the traffic of the Texas Pacific road with a gauge of 3 ft. 6 in., but certainly a less gauge than this would utterly fail for the purposes designed.

Again, a first-class road involves one with engines with power capacity for haulage. Practical constructors of locomotives hold it extremely doubtful if engines can be built on a gauge less than from 3 ft. 6 in. to 4 ft. with fire box enough to burn the light woods which must be the fuel of the Texas Pacific and the south-western roads, and produce the requisite amount of steam. This is a highly important question. The general failure of expensive roads to pay dividends, had created a clamorous demand for cheaper railways. In fact, only cheap railways can be built in many sections. In the South-west the means to build expensive railways can not be found. It must live on without this means of development unless a system of cheap railways can be adopted. It is doubtful whether the Southern Pacific Railroad can be built, except a plan far cheaper than the usual one is devised. One expensive railway to the Pacific coast is opened, and funds to construct another at similar cost will not readily be gathered; but to build roads so cheap as to utterly fail of their purpose would be worse than building none, as whatever they do cost would be squandered. Again, cheapness of construction or operating does not wholly depend upon very narrow gauge. Admitting that we can use light, small cars, light rails, short crossings and light embankment, then with all that

it is immaterial, as to cost of construction or operating, whether rails be spread 3 or 4 feet apart, but it makes the vastest difference in the safety of the road and the speed that may be attained. The cars must be large enough to do the work, the engines heavy and powerful enough to haul the trains, and the rails and superstructure heavy enough to bear this load.

Fixing these points there is no perceptible difference in the cost of machinery or of operation whether rails be laid 3 or 4 ft apart. The popular mind has caught the idea, from the clamor for cheap railways, that narrow gauge accomplishes it. That does not necessarily follow. A road could be quite as expensively built on a 3 ft. as on a 5 ft. gauge. What we really want is a class of rolling stock just as light and small as will properly and economically do the limited work which the greater number of our roads in the undeveloped West and South will have to do for many years to come. Then we need have rails and substructure only adequate to properly support this weight of rolling stock. Then we should fix a gauge for the rail which will give a secure angle of stability to the cars and engines which we have fixed upon as large enough, and wide enough for our business. All this being obtained we shall have a first-class road, according to Mr. Mann's idea; and shall secure what we must to get any roads at all in the West and South and what the popular mind demands—comparatively cheap railways. He would have the narrowest gauge upon which a road can do its specific work. And as that work is similar throughout the South west, a uniform gauge should be adopted. Many prominent railway men are led, in the popular fever for cheap railways, to demand a 3 ft. gauge; but they have not sufficiently studied details. Such a gauge is too narrow for South-western roads. Four feet is the true gauge—possibly 3 ft 6 in. may do.

The question is a grave one. If we can build cheaply, a vast amount of railway will be constructed in the South-west in the next five years. We are about to enter on a new era in railway progress there. It is all important that a uniform gauge be adopted, and that that gauge should be the correct one, to avoid changes in the early future. The Texas Pacific will govern the gauge question in all that region. Much depends upon that road making no mistake in this matter. They must be permitted to adopt the narrowest gauge that will properly and efficiently do the work the country demands, and perform the service government will require. What this shall be is too grave a question to settle hastily. It involves points which only able engineers, car and locomotive constructors and practical railroad operators can determine.

As Government proposes to aid the Texas Pacific road, and as it has a deep interest in having an efficient road built, Mr. Mann suggests that a board comprising engineers experienced in construction of roads and locomotives, etc., and men engaged in operating roads, should be convened to consider the question of gauges and recommend one which shall most nearly meet the points of efficiency and cheapness. The board should be big enough to have all departments pertaining to the construction and operating of railways represented; should meet soon, and should receive, orally or in writing, the views of the advocates of the various gauges and systems of construction. On their decision the Government might act in relation to the Texas Pacific, and undoubtedly all roads in that section would acquiesce, and thus the great de-

sideratum—an uniform gauge—be secured in the South-west.

It seems to us that views so ably and dispassionately expressed, can not but have their due weight with our Government authorities, as they ought with the railway profession and the public; and we sincerely hope, for the benefit of the entire South-western railway systems and the country, that these suggestions may be promptly acted upon.—*Railway Review*.

Cincinnati & Terre Haute Narrow Gauge Railroad.

General Hunter addressed the Common Council, last evening, in behalf of the Cincinnati & Terre Haute Railroad. He said that a company of prominent men had been organized for the purpose of building a narrow gauge railroad from this city through the counties of Clay, Owen, Monroe, &c., on to Cincinnati. That the road would run over the richest coal fields of Clay county, and across the fine limestone and sandstone quarries of Owen and Monroe counties. That the track would be within a few miles of the celebrated iron ore beds of Monroe county, where there was enough iron ore to supply the demands of the country for years to come. Gen. Hunter showed that by the Indianapolis & Vincennes road this city had lost a large trade which had formerly come here, and by the building of this road that valuable trade could again be drawn to this market. That the section of the country through which the contemplated road would run, embraced the finest timber lands in the State, and that thousands and tens of thousands of acres of this land had never yet been invaded by the woodman's ax, but the whole country was dense with large timber, such as is used for all kinds of building and mechanical purposes.

The company propose to build this road, provided they can get the proper and necessary encouragement along its line. It was folly to expect railroads to be built unless the people who were benefited by them would assist. There never was a railroad built in this country unless the people along its line helped do it, or it was assisted by the General Government. The General showed that this road, when completed, and stopping in this city as its terminus, would increase the aggregate value of the property of the city at least ten per cent. He asked that the city council take the \$100,000 which some time ago it appropriated for the purpose of helping build a road to Bloomfield, which road will never be built, and subscribe it for stock in the Cincinnati & Terre Haute road, which will then be sure to be built. This will only be about one per cent, on the taxables of the city, and in a strictly financial point of view was a good operation.

He made this proposition to the council, that if they would make the above appropriation of \$100,000, the company would not ask of them the payment of one cent, until 25 miles of the road were entirely finished, and the cars running from this city as far as Eel river. And this 25 miles he promised should be completed within four months from the time the council made the appropriation. We were pleased to see present, and listening with great attention to the remarks of the General, many of our most enterprising and heaviest business men. Some of them have seriously felt the loss of the Clay and Greene county trade, and are desirous of doing that which will again secure it.

The advantages of the narrow gauge rail-

roads were forcibly presented by Gen. Hunter, but as we have before us several articles on that subject, which we intend to give to our readers from time to time, we will not refer to what he said on this particular point now. But this question, affecting seriously the future of our beautiful city, is now before the official authorities of the city, and we hope they will give it all the consideration its importance demands.

The following is a list of the names of the officers of this proposed road, who were elected on the 1st of August last:

President, N. M. McDowell, of Canton, O. Treasurer, John D. Scully, of Pittsburg, Pa. Secretary, A. B. Quackenbush, of Pittsburg, Pa. Directors: Wm. Blakely, of Wellsville, O.; James B. Foley, of Greensburg; James Small, of Bloomington; Linus A. Burnett, of Terre Haute.—*Terre Haute Gazette*.

New Railway Organizations in Indiana.

Articles of association of the Vincennes & Cairo Railroad Company, of the State of Indiana, for constructing, owning, equipping and operating a railroad from Vincennes Indiana, to the Wabash river, near the town of St. Francisville, and to construct, in connection therewith, a railroad bridge across the Wabash river, to connect with the Cairo & Vincennes Railroad Company, of the State of Illinois, were filed with the Secretary of State yesterday. The articles provide for the building of said road from Vincennes, through the county of Knox, on the most direct practicable route, to a point on the Wabash river near St. Francisville, Illinois and will be about 10 miles in length. The capital stock is placed at \$100,000, divided into 2,000 shares of \$50 each. The board of directors for the first year are: Thomas R. Cobb, Cyrus M. Allen, William B. Robinson, G. H. Dusenberry, Andrew J. Thomas, of Vincennes; Henry M. Burnside, of Indianapolis; A. E. Burnside, Providence, R. I.; D. R. Larned, Joseph P. Chris, Charles H. Hatch, of New York city, and Rowell Miller, of Cairo, Ill.

The entire capital stock is subscribed.

Articles of association of the Indianapolis & North-western Railway Company, agreed to Aug. 1, 1871, were also filed with the Secretary of State, yesterday. The company has for its object the construction and maintaining of a railroad from Indianapolis through the counties of Marion, Hamilton, Clinton, Carroll, White, Jasper, Newton and Lake, to the State line, in the general direction of Chicago, Illinois, with western and north-western connections. Estimated length of line, 139 miles. Capital stock, \$3,000,000; divided into 60,000 shares of \$50 each.

—That is a long fence the Burlington & Missouri Railroad Company is building. It will put up not less than 200 miles of board fence this year, at a cost of \$175,000 or \$200,000.

The postoffice department is congratulating itself on the increased prospects of making the postal service self-sustaining. It is found that the revenue thereof for the present fiscal year is \$1,000,000 more than last year.

Out of the total exports of cotton from the United States this season, up to the latest mail dates, the shipment to other ports than those of England and France, embrace 625,937 bales, compared with 231,070 last year.

Why Money is Cheap.

The London *Economist* accounts for the cheapness of money by the simple and obvious explanation that "there is more of it." In support of this view it gives the following table showing the increase of deposits in the Bank of England, and other leading financial institutions in London:

AMOUNTS OF DEPOSITS IN LONDON BANKS, JUNE 30			
	1871.	1870.	Increase.
Bank of England (July 5)	34,220,000	28,011,000	6,159,000
London & Westminster	22,708,000	19,600,000	3,108,000
London Joint Stock (inc acceptance)	14,617,000	12,812,000	1,805,000
Union	12,715,000	10,050,000	2,665,000
National Discount Comp ^y	9,570,110	8,089,000	1,481,000
	93,890,000	78,612,000	15,278,000

This amount only represents the additions to the deposits of the five leading financial institutions in London. The increase is no doubt general among the various banks throughout Great Britain, amounting to a total of not less than \$100,000,000. This addition to the recent supplies of floating capital in England, is by no means limited to that country. The Bank of France within the past year has increased the available capital of the country by an addition of \$75,000,000 to the paper currency. This currency is irredeemable, yet, strangely enough has not fallen in value, but is at par with gold. So far it may be regarded, for the time being, as a veritable addition to the capital of the country, and as having a corresponding effect upon the money market. The Bank during that time also disbursed about \$150,000,000 in gold, and the late loan called out a large amount of reserved or hoarded wealth, amounting probably to not less than \$100,000,000. Here we have a total addition of \$325,000,000 to the floating capital of France.

In the United States also large sums of money have been thrown on the market. The July dividends on corporate, government and private indebtedness paid out in this city may be estimated at \$100,000,000, and for the entire country at as much more, making a total of about \$200,000,000. The increase of National Bank deposits and the disbursements of the Federal Government in liquidation of the Public Debt, also constitute a large aggregate. The following table of the additions to the floating capital of the three leading commercial nations will afford a clue to the peculiarities of the money markets of the world:

ESTIMATED RECENT ADDITIONS TO FLOATING CAPITAL IN ENGLAND, FRANCE, AND THE UNITED STATES.

ENGLAND.	
Actual increase in deposits of five London banks	\$76,390,000
Estimated additions in a further banks in Great Britain	100,000,000
	\$176,390,000
FRANCE.	
Increase of currency	\$75,000,000
Bank coin disbursements	150,000,000
Reserved savings	100,000,000
	325,000,000
UNITED STATES.	
Increase of National Bank Deposits, ending June 10, 1871	\$89,954,943
Disbursements for Bond purchases in currency, from March, 1869, to August, 1871	249,029,656
Disbursements for Federal, Corporate, and other dividends, since July last	200,000,000
	538,984,599
Total	\$1,435,384,599

These figures represent recent additions of \$1,000,000,000 to the floating capital of the three leading commercial nations. No doubt

much of this money has already found its way into permanent investment. But nevertheless this addition of capital to active circulation must exercise an important influence on the money market by increasing the supply of funds. The actual results go far towards accounting for the unprecedented ease in money. It is now impossible to obtain more than 3 per cent. for call loans in this city, and the average rate is only 2 to 2½ per cent. Short date commercial paper passes readily for 5 per cent., and long date paper is in better demand than supply, at 6 to 7 per cent. In fine, six months discounts are now cheaper in this market than were call loans a few years back. In London the Bank of England rates of interest are down to 2 per cent., and have remained longer at that figure than has ever before been known.

But the explanation of our London contemporary—that money is cheap because there is more of it—does not entirely account for the ease in the rates. The question still recurs, why should money apparently accumulate faster than the capacity of the community to absorb it? The political disturbances in the Old World, and the bad commercial and financial laws in the United States, would partially but not entirely account for the existing condition of affairs, and the absence of a demand for capital for reproductive purpose. It is probable that much of the so-called capital is fictitious, and is the result of undue additions to the circulating medium. A still more startling hypothesis has been advanced to the effect that the prevalent theory respecting the productiveness of capital is erroneous. Owing to the continual labor necessary to maintain its productiveness, it is not said to be worth more than the product of two years' labor. Without going further into this inquiry at the present time, it is apparent that owing to a combination of causes the money market is likely to remain comparatively easy for some time to come.—*Economist*.

Liability of Railway Company for Detention of Baggage.

John Anderson vs. Toledo, W. & W. R. R. Co.—This case was an appeal from the Lee Circuit Court (Iowa) to the Supreme Court of that State, and recently adjudicated by that latter tribunal. The facts sufficiently appear in the opinion of the Court, Beck, J.

The plaintiff was a passenger upon defendant's railway. Arriving at Keokuk, the place of his destination, he presented his "check" for his baggage, which, detained upon some other road connecting with defendant's, had not arrived, and was not delivered to him for several days afterward. Plaintiff in this action claims damages at the rate of \$3 for each day's detention by the neglect and careless handling of his baggage by defendant, and in not delivering it within a reasonable time.

There is no allegation or proof of damage done to the baggage. The plaintiff claims to recover under the statute of Iowa, quoted below. The Circuit Court instructed the jury that if they found that the baggage had been unnecessarily and negligently detained by defendant or its connecting lines of road, they should allow plaintiff \$3 for every day's detention on account of its non-arrival, after notice to defendant. The statute provides "that proprietors of omnibuses, transfer companies, or other common carriers, doing business within this State, shall be held liable in an action at law for damages occasioned to baggage or other property belonging to trav-

elers, through carelessness or negligent handling while in possession of the companies, or common carriers, as above named.

"That for every day's detention in consequence of damage, as before described, and necessary delay of suit for same, said companies shall pay to such person so delayed a sum of not less than \$3, which amount shall be added to the judgment for damages to property, should the action be sustained."

The intention of this statute is obvious. It is to give travelers a remedy for injury done their baggage by careless or negligent handling, while in the possession of common carriers, and compensation in the way of damages for detention caused thereby. It does not provide for an action to recover on account of the detention of baggage—failure to deliver same.

Baggage may be detained without damage—injury thereto. Such a case is not within the statute. Under the statute, recovery is not authorized for detention of the traveler unless it be on account of damage done to the baggage. In this view of the law and that it is correct, is too plain to admit of discussion, the plaintiff's petition and evidence do not bring the case within its provisions. The Circuit Court's instruction to the jury, above set out, was therefore erroneous.

The cause is reversed.

Journal of Railroad Law.

The Legality of the Acts of a Corporation out of the State

In the Supreme Court of the United States, in the case of the Galveston, Houston & Henderson Railroad Company et al vs. N. G. Cowdrey et al., it has been decided that a railroad corporation can not repudiate a mortgage given to secure its bonds held by holders in good faith, on the ground that its directors authorized its execution, by a resolution passed at a meeting held without the limits of the State, the mortgage being, in other respects, executed and recorded in due form of law.

Concerning the Power of Counties to Grant Aid to Railroad Companies

The Supreme Court of Kansas, in an opinion of forty closely printed pages, more extensive and elaborate than any we have elsewhere seen upon the subject, has thoroughly reviewed the entire law as to the right of municipal corporations to subscribe for stock in railroad companies, and has decided the law to be constitutional. The opinion cites, probably, every important case in this country upon the subject.

The analysis of the decision may be found in the following head notes:

The Board of County Commissioners of the County of Leavenworth vs. Edward Miller—Error from Leavenworth County—Affirmed—Syllabus by the Court: Valentine J.

1. The question whether the Legislature possess the power to authorize counties to grant aid to railroad companies by subscribing for stock therein, and issuing bonds in payment therefor, when it comes to the courts is purely a legal question, and the courts have nothing to do with the wisdom or policy of such legislation.

2. The Legislature have no inherent power, but all their power is derived from the people through the constitution of the State.

3. The people, in their primary capacity, possess all the political power of the State,

and may themselves authorize counties to grant aid to railroad companies; or they may, if they choose, delegate this power to the Legislature, and allow the Legislature to grant such authority to counties.

4. The Legislature can not exercise any power retained by the people, or not delegated by the people to the Legislature.

5. Where the provisions of an act are designed for the whole State, and every part thereof, such act has, in contemplation of section 17, article 2, of the constitution, a uniform operation throughout the State, notwithstanding the condition or circumstances of the State may be such as not to give the act any actual or practical operation in any part thereof.

6. Section 8, article 11, of the constitution, which prohibits the State from ever being a party in carrying on any works of internal improvement, applies to the State in its sovereign corporate capacity, and to the subordinate political subdivisions thereof. It prohibits the State as a State, and not counties, as being parties in carrying on any works of internal improvement.

7. There is no express provision of the constitution which prohibits the Legislature from authorizing counties to become stockholders in railroad companies, and issuing their bonds in payment for such stock.

8. All presumptions are in favor of the constitutional validity of a statute, and before the courts can declare it invalid it must clearly appear to be unconstitutional.

9. The power of the Legislature to pass an act granting municipal aid to railroad companies, must be found in the general grant of legislative power of section 1, article 2, of the constitution, which provides that the legislative power of the State shall be vested in the Legislature, or not at all.

10. At the time the constitution was framed the term "legislative power," had a definite and precise signification with reference to this question, established by legislative, executive and judicial construction, practice and usage, and the general understanding of the people throughout the United States, which general understanding and signification was that the term "legislative power," included the power to grant municipal aid to railroad companies, and, therefore, in the absence of anything to the contrary, it must be presumed that the people of this State, when they framed their constitution, used said terms with the signification generally given to it, and, therefore, that they intended to give to the Legislature the power to pass acts granting municipal aid to railroad companies.

11. If such was the intention of the people, the constitution must be so construed by the courts, and the courts have no power to amend it, or change any of its provisions, or insert any new provisions in it, through the means of judicial construction or interpretation.

12. The aid given to a railroad company is not strictly for a private purpose, nor wholly for a public purpose, though the object intended by the Legislature is a public purpose.

13. The government may accomplish a public purpose through the means of a private agency, a private individual or individuals, or a private corporation.

14. It is the ultimate object to be obtained which must determine whether a thing is a public or a private purpose.

15. The ultimate object of the government in granting municipal aid to railroads, is to increase the facilities for travel and transportation from one part of the country to the

other, which object is in its nature a public purpose.

16. And if a railroad is made absolutely free for every one who chooses to ride and transport goods upon it, it is still a public purpose, notwithstanding the government may allow a (in other respects) private corporation to own and operate it, and to receive a compensation therefor, provided it is a road for which the government exercises the right of eminent domain and retains the right to fix the compensation.

17. Taxation is the most universal power possessed by governments, being an incident and auxiliary of every other power, and may be resorted to whenever it is necessary to accomplish a public purpose, or to carry out any other power granted to the Legislature.

18. The localities along the line of a railroad may be taxed to aid its construction and operation, if they choose to take stock therein and issue bonds thereto, and a fair rule of apportionment of which the taxpayers can not complain, is to allow the localities to be taxed, the privilege of saying how much the benefit of the improvements is worth to them, and for what amount they are willing to be taxed.

CAR WHEELS AND AXLES—In an action recently tried in England against a railroad company, it was testified that experience has shown that by tapping, defects can be detected in the wheels but not in the axles, but that the only way to find out whether an axle is sound or not, is to break it. The plan adopted is to break several specimens taken at random from a lot of axles, in order to find out whether the iron is good. If the test be satisfactory, the rest of the axles are taken on trust. The breaking of railway axles very seldom occurs. In the case before the court, which was an action for damages against the railroad company, arising from injuries caused by the breaking of an axle, it was proved that this particular axle had been in use for 18 years, and that after it broke a fracture extending around it to the depth of half an inch was discovered. This was the case in the axle which broke recently upon the Maine Central railway at Freeport.

A machine has now been perfected which may be applied to cooling the air of theaters, halls, and all public or private edifices. One of these machines will either produce 200 pounds of ice per hour, or will furnish in the same space of time 30,000 cubic feet of air, cooled to a temperature of 33 degrees Fahrenheit. It is probable that in a few years we will turn on from the same registers the cool air in summer and hot air in winter. The application of such an apparatus to the pipes of a heater would be extremely simple, and furnish just what we want when the heater is off duty.

An objection to the use of enameled iron for roofs consists, it is stated, in the unequal expansion, by heat, of the metal and the enamel coating, so that a fracture of the latter is produced. This difficulty Dr. Dingler has attempted to obviate by using a more elastic coating between the metal and the hard face.

—The opponents of the Vanderbilt lines propose to have their road built to Chicago in 1875, to cheapen the carriage of grain hence to tidewater by 80 per cent, to shorten the time of travel to New York to 20 hours, and the distance by 96 miles from Chicago.

—The Ohio & Mississippi Railroad Company, in narrowing the gauge of their road and stocking it with the necessary new equipment, made another "new departure." Their new engines, instead of being gay with polished brass and fancy painting, are of a uniform dead black. The saving in cost and in time spent in rubbing up will be very great.

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F. W. FARWELL, Secretary,
122 Washington Street,
CHICAGO.

H. J. BOND, Gen'l Agent,
22 West Fourth Street,
CINCINNATI.

RAILROAD NOTICE.

The Cincinnati & Great Northern Railroad Company.

The undersigned Corporators of the Cincinnati & Great Northern Railroad Company hereby give notice that Books of Subscription to the capital stock of said Company will be opened at the office of the Railroad Record, No. 467 Walnut street, Cincinnati, Ohio, on Saturday the 26th day of August next, at 11 o'clock, A. M., of said day, and continue open at the same place each day thereafter (Sundays excepted), until stock is subscribed sufficient to organize said Company, and as much longer as said Corporators may direct.

A. J. HODDER,
DURBIN WARD,
T. WRIGHT'SON,
S. W. MORTON,
ROBT. REDGER,
Corporators.

CINCINNATI, July 27th, 1871.

The Railroad Record.

E. D. MANSFIELD, - - - - - } Editors
T. WRIGHTSON, - - - - - }
A. J. HODDER, - - - - - }

CINCINNATI, - - THURSDAY, AUGUST 24, 1871

The Railroad Record,

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Shall we have the Kentucky & Great Eastern?

Since the notices in the papers of the plan and route of the Great Eastern, we have become deeply interested in it. It has been long known that, taking Cincinnati and New York as two points on a grand interior line, all the routes heretofore pursued were far out of the way. This was because there has been no continuous line between Cincinnati and New York made. They have all been made by piecemeal, the pieces being made to connect other points. The railroads between the Eastern Atlantic and the Central West have been made, like the streets of Boston, on cow paths. So little was known, or apprehended, of the future of railroads in this country, that no line in the whole country, except the Union Pacific, has been made on a predetermined plan, crossing the whole country. Even the New York Central, one of the most important roads on the continent, was made originally in seven parts. These were consolidated, but in the end a new line, cutting off 30 or 40 miles, had to be built.

Now, let us suppose that a company were formed to make a trunk road from New York to Cincinnati. Of course it would be impossible to make it on a precise straight line, but let us see what might be done. The Pennsylvania road is now nearly 100 miles shorter than any other, and of course has a great advantage over any other as a through route. But, as we showed in a former article, Pittsburgh is far out of the way, and the Pennsylvania road at least 100 miles longer than a

route to New York need be. Now can not that error be remedied, and yet the capital invested be profitable? We think it can, and let us examine the facts and see if it be not so.

In our recent trip to New York, over the Pennsylvania road, we saw one thing very clearly, that the great body of travel from Cincinnati east has been diverted from all of the routes north to the Pennsylvania road. Why? Obviously because the passenger can go to New York on the Pennsylvania road in both less time and less fatigue. If, then, we had another and a direct route, 100 miles shorter than that, taking the passenger in 22 hours instead of 26, there is no doubt the great stream of passenger traffic would go that way. The same would be true of the freight traffic, if as would be the case, the freight made a day sooner. Now let us see if this will not be true if the Great Eastern is made. In a former article we examined something of the geography and the distances of the proposed route. Let us go over the ground more minutely, and in detail.

1. Take the best map you can get, and lay your ruler upon Cincinnati and New York, and you will find that it is just 500 miles direct (rather under than over), not varying materially from the direct distance to Norfolk and Charleston. New York, Norfolk and Charleston are all on the circumference of a circle, of which Cincinnati is the center. It would be an immense benefit to Cincinnati, so great that we believe it would soon have a million of inhabitants, if we could have a direct radial line to each of these places. On the direct line to New York are Harrisburg, Reading, and Bedford (Pennsylvania). We believe that the passage of the mountains, near Bedford, is deemed impracticable. The next best route is a line that will be south of that. Hence the route of the Great Eastern through West Virginia is a near route, if those who make it shall remember that being south of the true line it should be the object to recover the true line as soon as possible. If the road can find a good grade, and we believe it can, through the western counties of West Virginia, it can strike Cumberland or Kanawha (Md.), and thence through York (Pa.) to Reading, where it is on the direct line, and whence a direct route to New York can easily be had. This route will be, if advantage be taken of all the cut-offs, about 625 miles, and will be 125 miles shorter than the Pennsylvania route. What will be the effect of this?

2. We come now to consider whether this will pay to the capitalist? In our opinion it will, provided always that the company can control the whole line from Cincinnati to New York. This is essential. To put the matter within entirely certain and reasonable limits, we call the distance 650 miles; and we assume (what we are assured by engineers who have reconnoitered the route is true) that the grades

are easy. In that case, a passenger from Cincinnati to New York can be put through in four hours' less time than is possible on any other route. This we consider as decisive. That difference of time will determine the choice of four-fifths of all the passengers who go from the immediate valley of Ohio to New York. That difference in the time of passengers will make a day's difference in freight. We consider, then, the difference of 100 miles between Cincinnati and New York is entirely decisive. Suppose, then, that only half of the passengers and freight from Cincinnati and Louisville (for Louisville is even more benefited), goes over the Great Eastern, we say, unhesitatingly, that, with the local traffic, it will pay all the capital invested in it.

We hear that gentlemen of mind, capital and reputation are interested in this enterprise. We trust they will go on, without any fear or discouragement, for if they can command the shortest line from Cincinnati to New York, we say, without fear of contradiction, they will receive more remuneration for capital than has been received from any railroad in America. Go on, then, and make the greatest artery of commerce in this country.

Yielding a Little.

The standard gauge opposers of the narrow gauge are having a pretty hard time of it. They are not only out-figured and out-written by the narrow gauge advocates, but the daily experience of the new roads, wherever they are in operation, contradict the charges made against them. This is the knock-down argument, and we are astonished, therefore, that the standard gauge men don't yield gracefully and at once.

They are coming down, however. There is no better evidence of this than the fact that they are reduced to the *argumentum ad absurdum*, and are asserting that the same principles upon which the economy of the narrow gauge are founded will warrant the construction of narrower gauges, and even down to no gauge at all. This is the argument the *Gazette* so flippantly advanced a few days ago, and shows to what desperate straits it is driven in this contest.

Another position recently assumed by the standard gauge advocates is, that all the advantages of light rails, light rolling stock, &c., that they concede as the special property of the narrow gauge, may be used upon roads of the standard gauge. This is yielding a little now, and paving the way for a general concession of the whole argument.

There is no use in arguing the matter any longer. To make statements, and array figures, and talk of mechanical principles, is comparatively easy, but there stand the absolute experiments (if official reports and the statements of respectable individuals are to be relied upon), which prove that narrow

gauge roads are profitably worked upon grades and curves that are not practicable in other and broader gauged lines; and that this is not done at the cost of speed. And also, that the economy in the price of their construction and equipment is such an item as not to be disregarded by any means, particularly when the business of the country such roads are intended to supply will not pay upon the greater cost of standard gauge lines.

Personal.

On Monday last, Mr. Ely, the able and experienced editor of the *Stillwater Valley Gazette*, published at Covington, Ohio, dropped in upon us, and stayed an hour or so, during which time we had a pleasant chat with him about the railroad interests of the country, and the hopes and prospects of the Stillwater valley for a road connection with the rest of the world by rail.

Mr. Ely insists that the people through his part of the country are wide awake to their interests, and appreciate the proposed Stillwater Valley Railroad scheme so highly that they will raise lots of money for the man or company who will put it through for them.

It is a good project, and with such assistance it ought to be made.

Mr. Frank Wade has been appointed the General Ticket Agent of the Indianapolis, Peru & Chicago Railroad, with headquarters at Indianapolis.

Our old friend Frank Chandler has taken charge of the General Ticket Agency of the North Missouri Railroad. Frank understands his business thoroughly, and we have no doubt the passenger receipts of the road will show it.

Mr. Fred Follett has been appointed to the position of General Ticket Agent of the Ohio & Mississippi Railroad, and Wm. B. Hale General Passenger Agent of the same road. Both of these are good appointments.

Gen. Fremont, Col. S. W. Morton, Judge Cutler and James T. Brady, reached our city on Tuesday evening last. They are here in the interests of the Walnut Hills Tunnel and the Kentucky & Great Eastern Railroad.

These are strong men, and they mean business.

A novel sperm candle has recently been introduced in London. According to the description, four lateral apertures near the lower end of the candle communicate from the outside with internal longitudinal passages, so as to admit air. By this arrangement, it is claimed, upward currents of air will be formed in the passages, which, issuing in close proximity to the flame, will procure more perfect combustion and increase the quantity of light given out by the candle. The longitudinal passages may either extend nearly up to the tip of the candle or pass directly through it.

Beers' Vibratory Rail.

Our attention has been called to a chart showing three sizes of this new rail.

The inventor is a skillful and scientific engineer, and claims that after a thorough test of three years, his vibratory rail has fully established its superiority over the rail ordinarily in use upon railroads, because it is 30 per cent. stronger in iron, and 40 in steel, which is the result of utilizing that proportion of dead weight and neutral axis of the T rail. He also asserts that his form of rail and fastening entirely prevents lamination or batter, even at the joints; and that the concussion from the wheel, acting upon a modified spring instead of an anvil, neutralizes the ordinary oscillation of the train, and consequent rapid destruction of the rolling stock as well as the rail.

Mr. Beers thinks that all these advantages will be secured by the use of his rail, and that an economy in first cost will be gained of \$1,000 per mile in iron, and \$1,500 per mile in steel.

Would it not be well for some of our railway managers to look into the merits of this invention. It is a reform in the right direction, and if what is claimed for it by competent and respectable parties, it ought to be more generally known and adopted.

THE NARROW GAUGE IN OPERATION.—The *St. Louis Journal of Commerce* says: The narrow gauge railroad recently put in operation to connect Alexander's iron banks with the Atlantic & Pacific Railroad is a complete success, with some slight improvement in the locomotive, which was the first of narrow gauge ever built in St. Louis. We have here a practical illustration of the economy of the narrow gauge. The track is thirty-six inches wide. The cars are built entirely of iron; the sides of the bed being $\frac{1}{2}$ inch, and the bottom (doors) $\frac{3}{8}$ inch iron. The cars are about 5 feet long and 3 $\frac{1}{2}$ feet wide, and cost in St. Louis \$155 each. One of these cars, weighing 1,440 pounds, carries 2 $\frac{1}{2}$ gross tons of ore; four cars, weighing 5,760 pounds, will easily carry 10 gross tons, while a common railroad car, weighing 16,000 pounds, only carries 10 gross tons; hence there is three times the amount of dead weight in a large car to carry the same freight as one of narrow gauge. When the roadway was planned, the company contemplated using horse power, and put down a light T rail—only 15 pounds to the yard—which is now used for steam narrow gauge, but proves too light, and rails 25 or 28 pounds to the yard will be substituted.

The velocity of electric waves through the Atlantic cables has been ascertained by Professor Gould to be from 7,000 to 8,000 miles per second. Telegraph wires upon poles in the air conduct the electric waves with a velocity more than double this. It is a curious fact that the rapidity of the transmission increases with the distance between the wire and the earth, or with the height of the support. The *Journal des Telegraphes* says that wires placed upon poles slightly elevated transmit signals with a velocity of 12,000 miles a second, and those at a considerable height give a velocity of 16,000 or 20,000 miles.

The New York Railroads.

The Annual Report of the State Engineer and Surveyor of the State of New York contains the usual tabulated statistics, which would be of much more practical value if they were accompanied with an index and fuller comparative tables, giving in one view the analysis of a series of years side by side with the current year. The volume as it is, however, is sufficiently bulky, and contains 1,056 pages, with reports of 164 railroad corporations, besides 106 street railroad companies. The former, as being the most important, will attract the chief attention. Forty-two new companies have been organized within the year, and sixty different statutes have been passed relative to the railroads by the Legislature of this State. The aggregate length of the roads is 7,165.84 miles, and of roads laid 4,773.60 miles. The double track is 1,650.63 miles. Including sidings and branches the whole length of road is equivalent to 7,930.19 miles of single track. The subjoined table shows the annual growth of the great railroad network to which the industrial wealth and commercial predominance of New York are largely due. The number of miles of railroad opened for public travel each year are reported as follows:

1831.....	17	1845.....	62	1858.....	11
1832.....	23	1846.....	8	1859.....	23 $\frac{1}{2}$
1833.....	1	1847.....	25	1860.....	7
1834.....	31	1848.....	244	1861.....	9
1835.....	25	1849.....	151	1862.....	58
1836.....	68	1850.....	297	1863.....	56
1837.....	74	1851.....	227	1864.....	47 $\frac{1}{2}$
1838.....	31	1852.....	227	1865.....	118
1839.....	55	1853.....	371	1866.....	56 $\frac{1}{2}$
1840.....	None	1854.....	109	1867.....	94
1841.....	51	1855.....	56	1868.....	169 $\frac{1}{2}$
1842.....	153	1856.....	33 $\frac{1}{2}$	1869.....	370 $\frac{1}{2}$
1843.....	64	1857.....	23	1870.....	370 $\frac{1}{2}$
1844.....	64				

This table shows the great impulse given to railroad enterprise by the gold discoveries of 1848, and the rapidity with which the railroad system of this State is now being extended by new through routes after many years, during which the existing routes from the seaboard to the West have gradually become too limited for the vast traffic seeking this port from the interior. The chief financial facts reported in this volume may be condensed as follows:

Capital stock by charter and acts of the Legislature.....	\$335,370,210
Capital subscribed.....	213,332,606
" paid in.....	234,225,159
Funded debt.....	\$107,238,276
Floating debt.....	2,069,354
Total debt, funded and floating.....	112,307,831
Cost of construction and equipment.....	249,228,896
Earnings from passengers.....	\$20,494,357
" freight.....	45,192,057
" miscellaneous.....	3,693,028
Expenses—for transportation.....	60,549,444
for interest.....	46,132,947
for dividends on stock.....	6,494,859
Length of roads in miles.....	7,165.84
" laid.....	4,773.60
double track.....	1,650.63
Miles run by passenger trains.....	13,916,438
Passengers carried, total.....	24,550,753
" one mile.....	912,626,984
Miles run by freight trains.....	20,901,689
Tons carried, total.....	20,572,212
" one mile.....	2,654,146,549
Persons killed.....	269
injured.....	264

The average cost for each passenger per mile is stated at 2.2675 cents, and the average rate of freight is 1.7016 cents per ton. The average expenses for transportation were 67.42 per cent. of all the earnings. An interesting table is given of the per centage of the transportation expenses from 1862 to 1870, to which we shall hereafter direct attention, as well as to other matters of interest now omitted for want of space. For last year the ex-

penses of the various New York roads are given as follows: Erie, 74.62; Lake Shore, 62.93; New York Central & Hudson River, 63.26; New York & Harlem, 62.21; Ogdensburg & Lake Champlain, 62.08; Rensselaer & Saratoga, 59.63; Rome, Watertown & Ogdensburg, 64.12; Syracuse, Binghamton & New York, 58.34 per cent.—*Fin. Chronicle.*

Misplaced Switches.

The recent serious and fatal accident on the New York & Newark Railroad, by which a train was thrown from its track in the path of a train coming in the opposite direction, by the misplacement of a switch, is the latest melancholy addition to an already long list of casualties of a similar nature, resulting, as in this instance, from causes which might have been averted by the adoption of simple precautions against them. No one will deny that persons entrusted with the responsible duty of managing railroad switches, should so discharge their duties that no accident should occur through carelessness or neglect on their part, but it is scarcely worth while to look for perfect fidelity on all occasions from the irresponsible servants of any corporation, and as no man is infallible, every one, however faithful, may at times make mistakes most disastrous and fatal in their consequences. In the recent casualty on the Newark road, the responsibility for the loss of life rests quite as much with the company as with the delinquent switch-tender, inasmuch as no precautions had been taken to provide against the consequences of a possible neglect of duty by the boy on whom the work of shifting the switches devolved. The immediate scene of the accident in question was the junction of a side track, only used by gravel trains engaged in hauling material for the construction of a branch line with the main track of the New York & Newark road. This side track is seldom used. On the morning of the accident, however, it was opened to pass a train into the gravel pits, and the switch-tender neglected to close the switch, thus leaving the main track open. This should not have been possible. The switch at this point should have been so constructed as to close itself automatically when not held open. Had such a switch been provided, the terrible accident with its attendant loss of life and destruction of property would not have occurred.

We commend this matter to the immediate and serious consideration of the responsible managers of every American railroad. The system of self closing switches is now in general use in England, and in some parts of the Continent of Europe, and the introduction of this great improvement has already been attended with the best results in diminishing the risks of travel by rail. Under this improved system, all switches communicating with side tracks or turn-outs close automatically—remaining open only so long as they are held so by the switch-tenders. This insures a degree of safety which can never be attained so long as the proper management of switches is dependent solely upon the intelligence and fidelity of the employees, who may lack the requisite experience, and who are liable at any time to make mistakes, or to neglect duty. It is one of the first conditions of safety in railroad management that the railroad track always remain closed, except when temporarily opened for a specific purpose, and to secure this, all switches should, as we have said, be so constructed as to close themselves the moment they are left alone. This simple precaution would prevent many of the acci-

dents which are now liable to occur at any time through the carelessness or neglect of irresponsible, intemperate or inexperienced switch-tenders, and greatly diminish the present great risk attending railway travel in most sections of this country.—*Iron Age.*

Corrected Table of Measures.

We are obliged to our correspondent, D. C. F., of Boston, for his criticism of a table of measures reprinted in a former number from a contemporary. Our correspondent remarks that the measures there given make the bushel 3224 cubic inches, the half bushel 1242, the gallon 264, and the half gallon 231 cubic inches, and that these amounts do not agree together; he closes with the desire that we give a correct table. As, by calculation, we now find that table to be entirely erroneous from beginning to end, we will satisfy his reasonable request.

A harrel contains 40 gallons, or 231 cubic inches each, or 9,240 cubic inches.

The United States standard bushel is the Winchester; its regular dimensions are a cylinder of 18.5 inches, interior diameter, and 8 inches deep; its cubic contents are, therefore, $9.25 \times 9.25 \times 3.1416 \times 8$, or nearly 2150.5 cubic inches.

The United States standard gallon measures 231 cubic inches; consequently a box, 24 inches by 24 inches square, and 16 inches deep, will contain 9,232 cubic inches, or nearly a barrel.

A box, $17\frac{3}{4}$ by 15 inches, and 8 inches deep, will contain 2,130 cubic inches, or nearly a bushel.

A box, $14\frac{1}{2}$ by 10 inches, and $7\frac{1}{2}$ inches deep, will contain 1,075 cubic inches, or half a bushel.

A box, 8 by 8 inches square, and 8 5-12 inches deep, will contain 538 cubic inches, or a peck, very near.

A box, 7 by 8 inches, and $4\frac{1}{2}$ inches deep, will contain 231 cubic inches, or a gallon exactly.

A box, 6 by 6 inches square, and $3\frac{1}{2}$ inches deep, will contain 117 cubic inches, or nearly half a gallon (of $115\frac{1}{2}$ cubic inches)

A box, 4 by 4 inches square, and $3\frac{1}{2}$ inches deep, will contain 56 cubic inches, or nearly a pint (of $57\frac{1}{4}$ cubic inches)—*Manufacturer.*

UNITED STATES COAST LIGHTS.—Every evening on the sea coasts of the United States, nearly 400 lights, including beacons and light ships, are lit. Of these there are 109 on the New England coast; 90 on the coast of Connecticut, New York and New Jersey; 103 on the coast of Virginia, the Carolinas and Georgia; 30 around Florida; 45 along the gulf of Mexico, on the shores of Alabama, Mississippi, Louisiana and Texas; and the balance, about 20 or 30, on the Pacific coast. The most elevated on the Atlantic coast are those at the entrance of New York harbor, on the highlands of Neversink, N. J., consisting of two towers and two lights, 248 feet above the ocean level; on the Pacific coast, that of Point Farrallon, at the entrance of San Francisco bay, 380 feet above ocean level; but the highest of all is that of Point Loma, at the entrance of San Diego bay, Cal., being 457 feet above the sea. The first are visible from the deck of a ship for a distance of over 25 miles; the second, 28 miles; the latter, more than 32 miles, the distance varying, however, in proportion to the height of the observer above the level.

The Cincinnati, Hamilton & Dayton Railroad.

STOCKHOLDERS' MEETING.

A meeting of the stockholders of the Cincinnati, Hamilton & Dayton Railroad was held yesterday morning, at the office of the company, in pursuance to a call issued by the directors. The object of the meeting was to consider two contracts negotiated by the directors and by them submitted to the stockholders for their ratification.

John G. Lowe, of Dayton, was elected chairman, and F. H. Short, secretary of the meeting.

The contract with the Cincinnati, Richmond & Fort Wayne Railroad Company, the Grand Rapids & Indiana Railroad Company, and the Pennsylvania Company, was first considered. The following is an abstract of the contract:

"The Cincinnati, Richmond & Fort Wayne Railroad is constructing a line to connect Richmond with Fort Wayne, in Indiana, some ninety miles in length, and will be finished within the present year.

"At Richmond it connects with the line of this company, known as the Cincinnati, Richmond & Chicago Railroad. At Fort Wayne with the Grand Rapids & Indiana Railroad, and the Pittsburg, Fort Wayne & Chicago Railway.

"The contract embraces:

First. A lease of the road from Richmond to Fort Wayne, when finished, to the Grand Rapids & Indiana Railroad Company, for the term of fifty years, at the actual cost of running it.

"Second. A mutual contract between all the parties for an exchange of business by the line thus formed, giving to this company an exclusive right to the business of the new road and of the Grand Rapids & Indiana road, to and from, by way of Cincinnati.

"Third. A provision by which the new line is to be supplied with machinery and rolling stock, by the three other companies, in equal proportions, for which an allowance of ten per cent. per annum on the appraised value thereof is to be made and charged as part of the running expenses; the property so contributed, however, to remain the joint property of the parties furnishing it.

"Fourth. The three companies so using the Richmond & Fort Wayne road also agree, that in case in any year the net earnings of the road shall be insufficient to pay the interest at seven per cent. on one million eight hundred thousand dollars of bonds, issued for its construction, they will jointly, and in equal proportion, contribute the amount of the deficiency, to be repaid, with interest, out of the future earnings of the road."

After some discussion, the contract was adopted by a vote of 14,336 to 306.

The contract with the Junction Railroad Company was then taken up. In consequence of a suit having been instituted, on behalf of the holders of preferred stock in the Junction Railroad Company, claiming priority over the second mortgage bonds, and the inability of the managers of that company to compromise with their creditors, as they anticipated, the further consideration of this contract was postponed until the same should be brought before an adjourned meeting of the stockholders of the Cincinnati, Hamilton & Dayton Company, to be held upon the call of its officers.

The meeting then adjourned.

Narrow Gauge.

A writer in the New York *World* defending the narrow gauge against the attacks of the Chicago *Gazette*, among other things says:

"Let us now proceed to explain exactly what is claimed for the new narrow gauge, and see on what evidence the facts are based. In a letter from Mr. Fairlie, the father of the new narrow gauge system of constructing and operating such lines, which appeared in the *World* of August 2, he states the latest trials made on the Russian narrow gauge line opened in Russia. I have now before me a printed document giving the results of that trial.

This line is known as the Imperial Livny Railway. It is fifty-seven versts, about thirty-nine miles in length. It is vouched for by Count Alexis Bobinskoy, President of the Russian Railway Department of Public Works, and by Professor Saloff, President of the company, and a number of high State and railroad officials and engineers, that one of Fairlie's double bogie engines weighing twenty tons, drew a freight train of the gross weight of 345 tons up a grade of 1 in 80 for a distance of seven versts, or about five miles, on which there were several reverse curves of from four to six chains; that of this 345 tons 254 were paying, and only 91 non-paying loads; that the actual cost of the work and plant were 60 per cent. of the cost of Russian railways of the five foot gauge. This test was considerably in excess of the contract of Mr. Fairlie, who is now Chief Engineer of the Russian Department of Narrow Gauge Railways.

I have already, in the *World* of July 24, contrasted the results of the European narrow gauge lines with the New York Central. It would only be a waste of time and of your valuable space to repeat these facts in detail, unless somebody denies their correctness. If the writer in the *Railroad Gazette* wishes to promote the public service and add to his scientific reputation, let him revise his theories on the basis of the latest and most authentic facts with which I have supplied him. Let him also supply himself with the carefully compiled reports of the commissions of eminent experts, appointed by three or four European governments and the governments of India and Queensland, who had a number of experiments made in their presence on the narrow gauge lines of Wales. If the conclusions of these commissioners were right, then the *Gazette* is wrong in its assertions about "the fallacies" of those who are seeking to introduce cheap railways into this country. I have before me late copies of London *Engineering*, the London *Engineer*—two of the highest scientific authorities in the world—and the London *Railway News*, all containing lengthy articles sustaining all that Mr. Fairlie and his friends and disciples claim for the Russian and other narrow gauge lines. Until we can have equal experience in this country we must necessarily rely on that of Europe.

As a science, railway construction and operation belong to that class known as "experimental sciences," and as the questions at issue have been brought to the test of practical experiment in Europe, it seems to be folly to argue on the data supplied by the old gauges, except for the purpose of making contrasts. Nor are we bound to accept as argument what might be done by improved rolling stock on the broad gauges. What we have to do with is what is doing on the best of them.

I showed, in an article in the *World* of the

24th July, that the actual freight hauled in 1869 on the New York Central, one mile, amounted to 410,000,000 tons, and that it required an equal amount of rolling stock or dead weight to do the work. As some errors inadvertently crept into the figures contrasting the results of the narrow gauge lines of Europe with the Central, and as I had not then received the account of the Russian trials, I ask permission to state what the results would have been on the Central with a 3 feet 6 inch track and Fairlie rolling stock—taking the Russian tests as the basis of the calculation. These tests showed that 91 tons of rolling stock hauled 254 tons of paying load up heavier gradients than any on the Central line. The 91 tons does not include the weight of the engine, say 19 tons, which raises the total to 110 tons dead weight. If the dead weight required to haul 254 tons is 110 tons, what will be required to haul 410,000,000 tons? Answer—178,000,000, saving 232,000,000. The Russian narrow gauge is 3 feet 6 inches. In the article of July 24 three feet was made the basis of the calculation. The dead weight was set down at 153,000,000 for that width. If we add one-sixth for the additional breadth of the Russian gauge, it would make the dead weight 178,500,000, showing that the ratio of increase is in proportion to the ratio in the breadth of the gauge.

In the year referred to, the New York Central carried 206,000,000 passengers one mile, and in doing so it took 306,000,000 tons of rolling stock to perform the work, or one and one-half tons per passenger. The *Ohio Statesman*, describing the passenger cars of the Denver & Rio Grande three foot gauge line which had lately passed through *en route* to Denver, says: "they are finished in the most modern style, with water-coolers, saloons, etc., complete. They will seat thirty-four passengers, making a dead weight of only four hundred pounds to each passenger. * * * The cost of the narrow gauge car is about \$3,000, against \$5,000 to \$6,000 for the broad gauge." The same paragraph goes on to say that the Denver narrow gauge railroad costs \$12,000 a mile—that is about one-half the cost of 4 feet 8½ inch lines. The facts quoted are given on the authority of the builders, the Jackson & Sharp Company, of Wilmington, Del. Does the *Gazette* question them? It does not, but in a weak way attempts to show that such cars can not be very comfortable, that a six-foot man can not stand up in them at the sides, though they are seven and a half feet high at the crown of the arch. Shall we receive such arguments from a writer who, it is obvious enough, did not take the trouble to visit and inspect them for himself?

IRON ROPE.—The largest rope in the world was recently manufactured at Birmingham, England. It is reported to be 11,000 yards in length, 5½ inches in circumference, and weighs over 60 tons. Made of patent charcoal wire, laid round a hemp center, the rope consists of 6 strands, with 10 wires in each strand. Each wire measures 12,160 yards, so that the entire length of the wire reaches the enormous total of more than 412 miles. To this is to be added the length of the yarn used for the center, namely, 27 threads, each thread measuring 15,000 yards, and giving a total length of about 230 miles. Adding together the wire and yarn, there is a grand total of 635 miles of material—all going to make up a monster wire and hemp rope a little under 6 miles long.

The National Balance Sheet.

The following is an official statement of the receipts and expenditures of the United States Government for the fiscal year ending June 30, 1871:

RECEIPTS.

From Customs.....	\$206,270,408 05
Internal revenue.....	143,098,153 63
Sales of public lands.....	2,388,646 68
Miscellaneous sources.....	31,566,736 53

Total net revenue.....\$383,323,944 89
Bal. in Treas'y June 30, 1870 149,505,867 78

Total.....\$532,829,812 67

EXPENDITURES.

For civil and miscellaneous...	\$69,498,710 97
War Department.....	35,799,991 82
Navy Department.....	19,431,027 21
Indians and pensions.....	41,870,892 32
Interest of public debt.....	125,576,565 93

Net ordinary expenses...\$292,177,188 25
Purchase of bonds for sinking fund, &c..... 120,735,147 13

Total net expenditures...\$442,912,335 43
Bal. in Treas'y June 30, 1871 109,917,477 24

Total\$532,829,812 67

This statement is important as showing the effects of the recent reductions of taxation on the revenue. In place of the falling off and possible deficiency in the revenue, as a consequence of reduced taxation, as estimated by Secretary Boutwell in his last annual report, there is a surplus of \$91,145,754. This is the more remarkable as the reductions were estimated as likely to amount to from \$50,000,000 to \$80,000,000. The result is in strict accordance with economic laws, which prove that every reduction is ultimately attended by an increase of revenue. The tax-paying capacities of the people are increased by a removal of the burdens on industry, and experience shows that a very slight advance in the price of commodities will exercise a most important influence in checking consumption. The English Government has acted on this principle with the result of considerably reducing the burdens of taxation, without any corresponding loss to the Treasury.

It is to be hoped that this lesson will not be lost on our people, and that they will insist upon receiving the benefit of the surplus in the Treasury. The revenue will bear a reduction to the amount of \$100,000,000, and if the reduction exceeds that sum by \$20,000,000 or \$30,000,000, there need be no apprehension of a deficiency.

The following is a comparative statement of the Internal Revenue receipts for the last three years:

1869.	1870.	1871.
\$160,039,344	\$185,235,867	\$143,098,153

It thus appears that the Internal Revenue receipts, under a revised schedule of taxation, that abolished several sources of income entirely and reduced others very considerably, is within \$42,000,000 of the maximum of former years. The internal taxes are now limited to imports on Spirits, Tobacco, Income and Stamps. With the exception of the repeal of the Income tax, which should take place immediately, it might be as well to make no important modification in the other sources of internal revenue, and give the people the immediate benefit of the long promised reduc-

tions in the tariff, the imposts of which are so oppressive and vexatious. The receipts last year amounted to the enormous sum of \$200,000,000 in gold. This leaves a handsome margin for a reduction to the amount of \$75,000,000 a year.—*Economist*.

Progress of Railroads in the United States.

The railroad first constructed in the United States was the Baltimore & Ohio, of which 23 miles were opened in 1830. It was for two years thereafter worked by horse power. The following statement will show the number of miles opened each year since that date:

Year.	Miles in Operation.	Annual increase of mileage.
1830.....	23	...
1831.....	95	72
1832.....	229	134
1833.....	380	151
1834.....	633	253
1835.....	1,098	265
1836.....	1,273	175
1837.....	1,407	224
1838.....	1,913	416
1839.....	2,302	389
1840.....	2,818	515
1841.....	3,435	717
1842.....	4,026	491
1843.....	4,185	159
1844.....	4,377	192
1845.....	4,633	256
1846.....	4,939	297
1847.....	5,599	669
1848.....	5,996	397
1849.....	7,365	1,369
1850.....	9,021	1,656
1851.....	10,982	1,961
1852.....	12,908	1,926
1853.....	15,360	2,452
1854.....	16,720	1,360
1855.....	18,374	1,654
1856.....	22,017	3,643
1857.....	24,508	2,491
1858.....	26,968	2,460
1859.....	28,789	1,821
1860.....	30,635	1,846
1861.....	31,256	621
1862.....	32,120	864
1863.....	33,170	1,050
1864.....	33,908	738
1865.....	35,185	1,277
1866.....	37,017	1,832
1867.....	39,244	2,227
1868.....	42,277	3,033
1869.....	47,254	4,999
1870.....	53,399	6,145

The number of miles constructed in the decade ending in 1840 was 3,513; in that ending with 1850, 5,508; in that ending with 1860, 21,614; and in that ending with 1870, 22,764. The greatest number of miles constructed in any one year was in that just passed, in which 6,145 miles were opened. The mileage constructed in 1869 and 1870 equaled 11,144 miles.

The United States bonds reported by the National banks as security for their circulating notes, are classified as follows: 1881s, \$66,990,980; 5-20s of 1862, \$30,334,400; other 5 20s, \$97,572,500; Pacifics, \$15,330,000; 10-40s, \$102,308,050; new funded loan, 5 per cents, \$49,277,650—total \$361,922,550. The new bonds on deposit as security for public deposit are: 1881s, \$1,968,500; 5-20s of 1862, \$1,575,100; other 5-20s, \$6,197,700; new funded loan, \$2,063,500; Pacifics, \$909,000.

English Railway Laws.

The New York *Journal of Commerce* informs us that "England has certain laws regulating railway travel which strike Americans as odd. In that country a man must not jump on or off a train while it is in motion; if he does, he is hauled before a magistrate and fined. At a recent session of a London police court two cases came up and were disposed of as follows: As the Windsor train was approaching the Clapham Junction station, the driver, not being able to see the signals through the fog, slackened speed. A passenger, being in a hurry to get off, jumped from the train while it was still moving, before it had reached the platform. He pleaded that he thought the train had stopped. The magistrate fined him a small sum and costs. In the second case, a workman was waiting for a train at the Battersea station. On its arrival, but before it had stopped, he rushed to get on, and fell between the platform and the carriages. He was picked up, taken before the magistrate, and had to pay a fine for his headlong temerity. In this country one of the inalienable rights which every American exults in possessing, is that of risking his own neck or limbs at pleasure. He may scramble on or leap from a train moving twenty miles an hour, or make the wildest of bounds for a ferry boat after it has left the slip, and that is nobody's business but his own; unless he happens to be harmed by the rash attempt, in which event his first impulse is to consult a lawyer to see whether the railroad or ferry company can not be made to pay damages. But that he has not a perfect right to take the hazard of being chopped to mince-meat under the wheels of a flying train, or to bury himself fathoms deep in the mud of an East river slip, is a thought that never enters his head. Without troubling ourselves to discuss the question of a man's right to take his own life, or cripple himself—which on grounds of the general public welfare we deny *in toto*—it need only be said that the English system of punishing the rashness of railway passengers has a good effect. The Englishman most prone to saltatory feats pauses before he tries to execute them on railway trains. It is not merely that a fine and payment of costs awaits him, but that he is detained by the arrest and examination before a magistrate, after a lock-up, perhaps, over night. For the few seconds that he would have gained by leaping from a train before it had stopped, he pays by the loss of a day or night, to say nothing of money out of pocket by the fine. This is a practical and personal application of the venerable maxim, 'More haste, less speed,' which the dullest of mortals can appreciate. Our own opinion is that the fewer hindrances and obstructions placed by railroads and ferry companies on the free movements of passengers the better. We are opposed to the excessive precautionary measures of locking up cars when in motion, and of erecting iron barriers at ferry docks, thus fettering the free motion of a thousand persons of sense in order that one foolish individual may be kept from hurting himself. The desired end could be reached much more easily by proceeding against the one foolhardy or stupid man who makes all these contrivances necessary, than to subject the thousand sensible people who need no protection to so much inconvenience and bother. Theoretically, the English system may be objectionable to our high pressure views of personal liberty, but practically it is an excellent one."

What Makes the Sea Salt.

We published in our May number (p. 118) a letter from a correspondent, who says it is "a fact that the ocean was salt millions of ages before there was any land at all." Admitting, for argument's sake, that there was a period when the ocean covered all the surface of the earth, it must be acknowledged that the bottom of the ocean was land, out of which those materials which were soluble in water would be extracted, to a considerable extent.

But it is not certain that the primeval ocean was salt, in the usual sense of the word. Quite possibly it contained predominately sulphates, instead of chlorides. These sulphates, as many suppose, have been precipitated in insoluble forms. At the present day, all rivers carry salt and other soluble materials to the ocean; and, as the sole outlet of the sea is evaporation, which carries pure water only upward, and leaves the different soluble salts behind, we are even driven to the conclusion that the saltiness of the ocean is continually increasing. The Rhine, for instance, carries every year to the ocean 30,000,000,000 gallons of water, every gallon of which contains 10 grains of salts in solution. This river alone, therefore, increases the salts in the ocean by the amount of more than 20,000,000 tons per year. But the Rhine is comparatively a small river, carrying not the two-hundredth part of the water which the ocean receives from other rivers, moreover, its water is comparatively pure, as most rivers carry more than 10 grains per gallon. We may safely say, therefore, that all the rivers of the earth carry every year more than 200 times 20,000,000, or 4,000,000,000 tons of dissolved salts into the ocean.

It is equally undeniable that rivers have been flowing in this way for ages. Consequently, we have only to suppose that circumstances have been, during a sufficient portion of the past, what we know they are now, and the saltiness of the present ocean is a necessary result, even if it commenced by being fresh.

Let us now see what geology has revealed to us in this respect. Our correspondent acknowledges that the ocean existed ages ago. This agrees with the teachings of geology; but we may conclude, also, that ages before the existence of the liquid ocean, the whole of it enveloped the hot nucleus of the earth as an immense atmosphere of vapor or steam, and containing, under heat and pressure, the constituents or many rocks. We now know to how great an extent the chemical activity and solvent power of water, or its vapor, is increased by heat and pressure.

When the earth had cooled so much as to diminish gradually the solvent power of hot water and steam, those substances which required the higher temperature, and pressure to be kept in solution were slowly deposited, in the order of their different degrees of solubility, while only those remained in solution which were soluble at the lower temperatures; a portion of the salts contained in the ocean are possibly, therefore, the remnants of a much more concentrated solution, existing in the early geological periods.

There were inland lakes at that time, as well as now, forming deposits of solid salt, crystallized out of their saturated waters, which had received the washings from the surrounding country, a process which we may still observe in the Great Salt lake, the Caspian sea, the Dead sea, and scores of others. By slow upheavals or depressions, the water supply of these lakes ceased; they dried up, and left the

salt deposits in England, Prussia, Poland, etc., from which we now derive our so-called rock salt, or through which water runs, and by its exit forms the different kinds of saline springs, as is the case near Spracuse, N. Y., where the salt deposits appear distributed in the strata called by geologists the upper silurian, accessible to the natural subterranean water courses, which are pierced with wells and tapped by pumping more easily than the solid salt could be reached. No doubt many miles of caves have been formed there by the washing out of the salt deposits, now filled by water.

We have said that the saltiness of the ocean is still increasing. This is strictly true; yet the present increase is very small when compared with the enormous amount of marine brine. Let us illustrate this by a brief calculation.

The surface of the earth is, say, 200,000,000 square miles; the area of the ocean, say, three fourths, or 150,000,000, and its average depth, say, two miles. We have, then: Total amount of water, 300,000,000 cubic miles; cubic feet in one cubic mile, about, 147,000,000,000; weight of brine per cubic foot, say, 64 pounds. Hence, weight of one cubic mile, 9,408,000,000,000 pounds, equal to 4,704,000,000 tons. Hence, weight of the whole ocean, 1,411,200,000,000,000,000, or more than one sextillion of tons. As about one thirtieth of this weight is salts, we have for the salts in the ocean about 47,040,000,000,000,000 tons, of which the 4,000,000,000 tons carried annually to the sea by our present rivers would form but one ten-millionth part. At this rate it would take 10,000,000 years to make the ocean as salt as it is now. But we need not suppose so long a period, for many reasons. In the first place, it is not likely that the ocean ever was without saline matter in solution. In the second place, the activity of rivers and springs in this regard must have been much greater formerly than now, when the land is pretty thoroughly washed out. In the third place, we have taken no account of the enormous action of the ocean itself on its sides and bottom.—*Manufacturer.*

The colleges and collegiate institutions in the United States, according to a list collected by the Commissioner of Education, number 469, of which 306 are colleges, 66 Roman Catholic schools, 68 female colleges, and 29 high schools for males. The Commissioner has prepared a chronological table of the universities of Europe, from which it appears that the first modern university was established at Bologna, Italy, in 1119. The dates at which universities were founded in other countries of Europe are as follows: France, 1196; England, 1201; Spain, 1222; Portugal, 1291; Austria, 1348; Switzerland, 1368; Germany, 1386; Scotland, 1410; Belgium, 1426; Sweden, 1477; Denmark, 1479; Poland, 1570; Holland, 1575; Ireland, 1593; Hungary, 1635; Finland, 1640; Russia, 1755; Norway, 1811; and Greece, 1823. The number of universities founded in Europe in each century was as follows: 12th century, 2; 13th, 11; 14th, 15; 15th, 23; 16th, 19; 17th, 9; 18th, 13; 19th, 21; making a total of 113.

A peculiar method of manufacturing bronze consists in introducing phosphorus, in some form, during the process of melting the copper, tin or other metals, which form the basis of the compounds, the effect being to very greatly improve the quality as regards elasticity, hardness and toughness.

Journal of Railroad Law.

RAILROAD COMPANIES—CAN NOT EXPEL PASSENGERS BETWEEN REGULAR STATIONS.

The facts in the late case of the Chicago and North-western Railroad Company vs. Peacock (48 Ill., 253), are fully and clearly stated in the following opinion by

WALKER, J.—The first question presented on this record is, whether an action of trespass will lie against a railroad company where the conductor forcibly ejects a passenger between stations on the road because he refused to pay his fare. It is urged that case is the proper remedy and that trespass will not lie. In the case of the St. Louis, Alton and Chicago Railroad Company vs. Dalby, 19 Ill., 353, it was, after full argument and upon mature deliberation, determined that the action of trespass would lie against such a company for forcible injuries inflicted by their employees while in the discharge of their duties in operating their road upon a passenger. And after reading appellants' argument in this case, we see no reason for dissatisfaction with the conclusion there announced, nor do we feel the least inclined to modify or abridge it in its operation. We believe the rule to be sound and strictly in analogy to the principles of the common law, which is the base of our system of jurisprudence.

It is also urged that this case is clearly distinguishable from that, inasmuch as the plaintiff in that case was at no time in the wrong, while in this case appellee placed himself in the wrong by refusing to pay his fare when called for by the conductor. We are not able to perceive that this creates or forms any well defined distinction in fact and none in principle. The facts slightly differ, but so slightly as to form no well grounded distinction. In that case the conductor wrongfully used force to eject a passenger from a train after he had paid his fare, and because he refused to pay an extra charge for failing to procure a ticket, which he had applied for but could not obtain of the agent, and after the assault and ill usage he paid the extra charge and was permitted to remain on the train.

The thirty-fourth section of the general law regulating our railroads, declares that "if any passenger shall refuse to pay his fare or toll, it shall be lawful for the conductor of the train and the servants of the corporation to put him out of the cars at any usual stopping place the conductor may select." And this provision has been held to apply to all railroads in the State. This, then, renders it lawful to put a passenger from the cars at any usual stopping place when he refuses to pay his fare, and, by implication, makes it unlawful to put such a passenger off at any other place. Then, when the conductor expelled appellee between stations on the road, he did an unlawful act. And in this the two cases are alike. Trespass was maintained in Dalby's case, because he had done no act or failed to perform any which authorized the conductor to put him from the train at that or any other place; while in this case appellee had done no act which authorized the conductor to eject him from the cars at the place where it was done. He failed to pay his fare when it was demanded, which authorized the conductor to require him to leave the train at a regular stopping place, and at such a place, he would have been required to request him to leave the cars, and in case he refused to then employ such force, and only such, as would be necessary to remove him from the cars.

In Dalby's case, the road was held liable

because the conductor used force where the law did not warrant it. In this case force was used where the law prohibited it, and hence the two cases are alike. In this case, it is true, appellee refused to pay his fare, but the law had said that for that the conductor should not remove him from a train except at a regular station. The law, so far from sanctioning the force used in this case, had on the contrary forbidden it. By the use of force in this case in ejecting appellee between usual places for stopping on the road, it was a trespass of its servants, precisely as in Dalby's case. Had the conductor stopped his train and ordered appellee to get off, and he to avoid altercation had obeyed, then, as no force would have been employed in wrongfully putting him from the train, the case would no doubt have been the proper remedy. It will be observed that the Court in Dalby's case, in stating the case, and not trespass, would lie, only refers to doing a lawful act in a careless and negligent manner, and not to the performance of an act which the law has prohibited, as in this case, with force and violence. What is there said would apply to putting a passenger who refuses to pay his fare from the cars at a regular station. Because appellee had failed to perform a legal and moral duty it did not authorize the conductor to take the law in his own hands, and in violation of the statute forcibly expel him at a place prohibited by the law.

It is next urged that the conductor was warranted in what he did because appellee said to the conductor that if he would stop the train he would get off, as he had passed the station where he had intended to leave the train, and when it was stopped he refused to leave. While such conduct is highly improper, and it is well calculated to try the patience of any conductor, and which no doubt subject appellee to damage for the wrong, and may be a mitigating circumstance in the case, we can not hold that it was a justification of the acts of the conductor. The law had prohibited him from forcibly expelling appellee at that place, and the offer to get off there, which was retracted, did not amount to a license to use the force and violence employed in ejecting him.

It is insisted that the damages found by the jury are excessive, and so much so as to require a reversal of judgment. A careful examination of the evidence in the case, shows that appellee did not receive any serious and lasting injuries; his face was scratched and the skin was abraded slightly on one or two places on his limbs. He, however, says he was kicked and hurt. Even conceding this to be true, he seems the next day, which was Saturday, and the next Monday to have been about attending to his business. It does not appear that he was confined to his room even, much less being confined to his bed from the injuries; he does not appear to have lost any time or suffered pecuniarily from those injuries; he does not seem to have been compelled to seek medical advice nor to have incurred any expense from his injuries. And when it is remembered that he committed the first wrong by refusing to pay his fare and having proposed to get off if the conductor would stop the train and then refused when the train was stopped, we think a thousand dollars damages as excessive and grossly excessive. That sum was held to be so in the Chicago, Burlington and Quincy Railroad vs. Parks, 18 Ill., 460, and the Terre Haute, Alton and St. Louis R. R. vs. Vanatta, 21 Ill., 188, and the judgment of the Court below in each of those

cases was reversed for that reason. It is true that in this case there was more violence employed than in either of those, but it seems to bear no proportion to the verdict of the jury.

It may be urged that the life of appellee was endangered, but it appears that if it was, it resulted from his efforts to again get upon the car after he had been expelled, and the train had started. He seems to have been ejected some three or four miles only from a station and in the immediate vicinity of a house and in a settled neighborhood. And although in the night and when the weather was cold, still he does not have seemed to have suffered pain, injury to his health or any great inconvenience. That he suffered in dignity and some personal injury there is no doubt, but when we see that he did the first wrongful act and when we consider the extent of the injuries inflicted upon him we are constrained to say that we regard the verdict as excessive, and while railroads like individuals must be held to the performance of every duty, they at the same time like individuals are entitled to the protection of the law, and in case where they are parties we will look at the circumstances in determining whether damages are excessive which juries have found against them. Had this been a verdict against an individual under the same circumstances it would have appeared palpably excessive.

The Court below erred in refusing to grant a new trial, and the judgment of the Court below must be reversed and the case remanded for a new trial.

Judgment reversed.

Railroad Law.

Railroad Companies—What does not constitute Negligence—Liability of Parents for Negligence of Young Children.

The facts in the late case of the Pittsburgh, Fort Wayne & Chicago Railway Company vs. Brumstead (48 Ill. 221), are fully and clearly stated in the following opinion by

BRESEE, Ch. J.—This was an action of trespass, on the case, brought to the Cook Circuit Court, by Thomas Brumstead, against the Pittsburgh, Fort Wayne & Chicago Railway Company to recover damages for an injury to a minor son, occasioned by the careless management of the locomotive and train of the defendants. The injury occurred at a station on the defendants' road, in the State of Indiana, called Castello.

The cause was tried by a jury, who returned a verdict against the defendants of \$4,500. A motion for a new trial was made by the defendants, which was overruled. On the plaintiff remitting, at the instance of the Court, \$3,000 of the verdict, thereupon judgment was entered against the defendants for the sum of \$1,500.

To reverse this judgment, the defendants have appealed to this Court, and several points are made, which we will notice.

It appears the injured party was a child about four years of age, living with his parents in close proximity to the defendants' railway track. On the day of the accident, he was left, by his mother, who had occasion to visit a neighbor, in charge of his sister, a girl fourteen years of age, and while she was engaged in some necessary duty in the house, the boy, without her knowledge, left the house, and soon after was found, to all appearances, dead, near the track, and was taken up and brought to his house, one of his feet crushed, and

otherwise wounded. It appears, a private cart road crossed the track near the dwelling of the boy's parents, which was used, without question, by every one who had occasion to use it. It was on this road the accident occurred, and was occasioned by an express train running with great velocity into a push car in advance of it, going in the same direction of the train, and such was the force of the collision that the push car was shattered to pieces, a fragment of which struck the boy, who was on the private road, and some considerable distance from the place of collision.

The first point made by appellants is, that the child was a trespasser on appellants' right of way, and his parents, in suffering him to be there, were guilty of such a degree of negligence as to furnish a complete defense to the company for an injury which would not have occurred but for this wrongful intrusion, unless the company shall be shown to be guilty of negligence so gross as to imply a willingness to inflict the injury.

The place where the accident occurred was, in fact, upon appellants' right of way, though not upon the track. The boy was struck while on a road used by the public, which crossed the track, and where he, in common with the rest of the public, had a right to be, until the company should forbid, or prevent, so much of its right of way from use by the public.

The next point made by appellants is, that the parents of this child were guilty of great negligence in leaving him with his young sister. We can not perceive, admitting it is a duty of the most imperious obligation resting upon parents, to use vigilance in the care of their off-spring of tender years, that the parents of this child were wanting in this requirement. A mother can not be always, at all hours, with her child, nor is there any necessity that she should be, nor is it practicable. She must perform her accustomed avocations; and in one moment a child of four years of age may escape from her notice; it can not be otherwise. The parents of this boy, the evidence shows, were in a very humble walk of life, who had, the mother especially, something more important to do than to watch her child, lest he came to harm. She had to contribute her labor to feed and clothe him, and it is unreasonable to demand she should have no other employment than to guard her child from danger. Leaving the child with his sister, a girl of fourteen years of age, and who appears, from her testimony, to be intelligent and affectionate, was not negligence. It was unavoidable, and she was trustworthy and competent to take charge of the child. What would be the public judgment of a rule of law which should forbid a mother to leave a child four years of age, with his sister of fourteen, while their mother was providing for their sustenance, or enjoying herself by a short visit to a neighbor? Such a rule would not receive the sanction of any Court, and is not to be found in any adjudged case, or in any legislative enactment, and has no reason in its favor. There was no negligence of the mother, and the child was in a place where he had a right to be, and at a safe distance from the railroad track.

The remaining point is, there was no negligence on the part of those having the train in charge.

On this point, the evidence establishes negligence in two particulars: first, in loaning the push car to be used by strangers, and second in not stopping the train in time to avoid collisions.

The loan of the push car, by the company's agent to persons not accustomed to its use, was a species of carelessness, nay, reckless-

ness, with which we did not suppose a faithful and competent agent could be chargeable. When the agent loaned it, he knew it was in violation of his instructions, the result of which might be pecuniary loss to his employers. His wrong act was, in part, the cause of this disaster, and life-long injury. But above and beyond this, the conduct of the engine driver, in charge of the express train, admits of no justification or palliation. It is impossible to believe he did not see the signals excited persons were making, warning the driver of danger, and it is beyond all controversy he could, if he had been ordinarily careful, have stopped the train in time to avoid collision with the push car, which was in plain sight for more than a mile. The fact that he supposed the push car was under the conduct of section men, who would take it off the track on the approach of a train, is no justification for his recklessness in crushing it to pieces. He should have known the car was not under the control of railroad employees, by the fact they did not attempt to remove it from the track on the signal being given. Not attempting it, the driver should at once have slackened speed, and broke up the train. This he could easily have done, and it was negligence of the grossest kind in omitting it, and, for the consequences, the company must be responsible. A railroad company has no right to keep in its service such a reckless man.

It is also made a point by appellants, that the Court erred in refusing to give instructions moved by them, numbered two, three, four and eleven.

The substance of number eleven was contained in the eighth instruction given for appellants, and the other instructions above specified were properly refused. Instruction numbered two, leaves out of view negligence of their employees in running the train, even if the child was a trespasser on the right of way, the driver had no right to run over him and crush him. Instruction three is liable to the same criticism, and so is number four.

Perceiving no error in the record, the judgment must be affirmed.

Judgment affirmed.

Aeronautics.

Since the days when Daedalus flew from his prison at Crete with wings constructed of feathers and wax, the human mind has been frequently exercised in the apparently fruitless attempt to navigate the air. The science of aeronautics, however, has hitherto received but little recognition from the general public save in the shape of ridicule, and although the Aeronautical Society of Great Britain has been in existence more than four years but little advance has been made towards a practical solution of the problem. We believe it is true that a modicum of success has attended the efforts of some ingenious mechanicians in America, but no human being has ever yet raised himself from the ground and floated in the air by means of a mechanical arrangement put into motion by the power inherent in his muscles. The experiments, which were successful in America so far as the model was concerned, took place near San Francisco. In these the flying machine was in the shape of a ship, 37 ft. long, 12 ft. wide at the planes, and 3 ft. diameter of cylinder. It was furnished with horizontal planes to support it when in the air, and with a small steam engine of about $\frac{1}{4}$ horse power to act as the motor in working the propelling wings and tail, and we believe it was also supplied with about 1,000 feet of gas to assist in neutralizing the dead weight of the machine. This apparatus is reported to have

exhibited an ability to travel in any direction, and even to work its way against a current of air sufficiently powerful to ruffle the water of the lake in the park where it was tried. So satisfied were those interested in the feasibility of their plan that a company was formed to construct a machine capable of carrying two or three persons and a 5-horse engine and boiler weighing only 364 lb. were actually constructed, but what measures of success has attended the operations of the company is not known. A Mr. Spencer, a few years ago, did actually raise himself from the ground by means of a wing, and was to have exhibited his machine and repeated the performance at the Crystal Palace, but owing to want of time and means nothing further has been done in the matter. About sixteen years ago a model of a flying machine was exhibited at the Polytechnic, the principle of which was the continuous rotary motion of an apparatus similar to a screw propeller. In this model a spring is wound up, which being let go sets in motion revolving planes, and the machine is lifted from the ground and sails in the air so long as the rotary motion is maintained by the spring.

It appears to us, however, that all attempts hitherto made have started from the wrong point, or have been based upon insufficient knowledge. It does not follow that because a bird soars in mid air by means of wings that therefore the mechanism necessary for a man to accomplish a similar feat should be constructed on the same principles. The fact is there are no really scientific data on which to found experiments having for their object the solution of this problem. We are, as Mr. Glaisher says, in total ignorance of the connection between velocity and pressure in an elastic medium like air, and in all probability what information we do possess is based on incorrect conclusions. We hail, therefore, with pleasure the announcement that the Aeronautical Society intend to inaugurate a regular series of experiments on this the most important part of the subject, the facts elucidated by which, will, it is thought, if properly understood, afford the only true foundation for a science of aeronautics. For this purpose an instrument has been designed by Mr. F. H. Wenham, the construction of which has been intrusted to Mr. Browning, and the experiments will be carried out by means of a fan not less than 30 inches in diameter, capable of delivering about 3,000 cubic feet of air per minute. In front of this fan a square wooden trunk will guide the blast, and afford facilities for ascertaining its velocity and for testing by an anemometer the force exerted on plane surfaces at different inclinations. When once these data are obtained in a trustworthy manner, the difficulties under which our mechanicians labor at present will be in a great measure removed, and in constructing machines for actual experiment in the art of flying they will be more likely to achieve success when the conditions of the natural laws and the forces with which they have to deal are known and thoroughly apprehended. So far as our present information guides us it would seem that it is not so much great power that is required but a small power skillfully applied in the proper manner; so that given the requisite amount of plane surface to enable us to utilize the air as a so called solid support, all that would appear to be necessary is the means of propulsion at a speed sufficient to counteract the influences of gravity. Whether this is to be obtained by wings or a modification of the screw propeller is a moot point at present. With regard to the propeller as the elevating apparatus it has been pointed out that if it does not rise it merely churns the air, and is as ineffective as the wings of a bird when the bird is secured to a post by its feet. To utilize a propeller as the elevating apparatus it must act on a fresh column of air at every revolution, and to obtain

this condition it is necessary there should also be means of obtaining motion at an angle to the direction in which the propeller would tend to guide the machine.

With regard to the application of wings to flying machines, it has been shown that amongst birds the amount of wing service decreases as the weight of the wing increases, and M. Harting, of Amsterdam, finds, from an examination of thirteen species of bats that while the length of the wing increases only in the simple ratio of the animal's size, the area of the wing surface augments in the ratio of a square, and the weight of the body of the animal in the ratio of a cube. He also calculates that a bat of the common species, *Vespertilio murinus*, weighing about 160 lb. would require wings each 87 in. long, and with an area of 1,807 square inches, to enable it to fly in the manner usual with bats. His investigations into the wing surface of birds as compared with their weight give the following results:—The lark weighs 70 lb., and has a wing surface of 11,625 square inches; the black bird weighs 195 lb., and has a wing surface of 16,430 square inches; while the laughing gull, a bird of powerful and long sustained flight weighs 434 lb., and has an area of wing of 51,305 square inches, an exception to the rule, similar proportions being found in nearly all the members of the family. But the mere wing surface necessary for flying is only one of the calculations to be made. Great differences prevail amongst birds in respect to the number of beats of the wing requisite to rise from the ground and sustain the body in mid air. Thus, while the sparrow rises immediately and almost perpendicularly, the albatross must run some distance before it is enabled to leave the ground, but once well poised a very slight motion of the wings sustains the bird in its flight, whereas the sparrow must flap its wings continually.

We have omitted to notice balloons in connection with aeronautics for obvious reasons. The science of aeronautics is one in which the problem to be solved is how to fly, not to float at the mercy of atmospheric currents. A balloon is essentially so unwieldy in shape and size that we think attempts to guide it are all that are likely to prove successful, although M. Dupuy de Lome considers that his fish shaped balloon, with its sail-rudder and screw for propulsion will move against the wind at a speed of five miles an hour. It will be seen from what we have said that the fundamental principles of the science are not yet rightly understood, nor have the necessary data for successful experiments been obtained; but now that the Aeronautical Society are seeking to put the science on a true basis, we may possibly bear some fine day of the triumphant result of their labors. —*Mechanic*.

VICTORIA STONE.—In a communication upon artificial stone made to the British Association by the Rev. Mr. Highton, the well known fact was adverted to, that certain forms of natural silica occurring in various parts of Europe, especially in England and Germany, can be dissolved under proper precautions even when cold. An important application has been made of this soluble silica in the preparation of an artificial stone which is harder than any natural stone except the hard granites and primitive rocks. The process indicated for neutralizing this, consists in first making a concrete of any good hydraulic cement. When this is dry, it is steeped in an alkaline solution of silica in which is placed a quantity of free silica. The following chemical process then takes place: The lime in the concrete extracts the silica from the solution leaving the alkali free, which immediately attacks the free silica and conveys it in its turn to the concrete. This process goes on continually till the lime in the concrete is saturated with silica. In

this way, within a week, the strength of the concrete is increased from 50 to 150 per cent. and to a still greater degree by a longer immersion. As the alkali acts only as a carrier of the silica, it is used over and over again, and it is in this that the economy of the manufacture consists. The substance thus formed is known as silicated concrete, or the patent Victoria stone, and it has been manufactured on a grand scale in London, and several large edifices have been built entirely from it. The economy of its construction is such that it promises to supersede natural stone, except where the latter is very cheap and abundant. In London it can be put in place in building at a much less cost than natural stone.—*Chicago Jour. Com.*

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The Cincinnati & Great Northern Railroad Company.

The undersigned Corporators of the Cincinnati & Great Northern Railroad Company hereby give notice that Books of Subscription to the capital stock of said Company will be opened at the office of the Railroad Record, No. 167 Walnut street, Cincinnati, Ohio, on Saturday, the 26th day of August next, at 11 o'clock, A. M., of said day, and continue open at the same place each day thereafter (Sundays excepted), until stock is subscribed sufficient to organize said Company, and as much longer as said Corporators may direct.

A. J. HODDER,
DURBIN WARD,
T. WRIGHTSON,
S. W. MORTON,
ROBT. REDGER,
Corporators.

CINCINNATI, July 27th, 1871.

The Railroad Record.

E. D. MANSFIELD, - - - - } Editors
T. WRIGHTSON, - - - - }
A. J. HODDER, - - - - }

CINCINNATI, - - THURSDAY, AUGUST 31, 1871

The Railroad Record,

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Another View of the Kentucky & Great Eastern Railway.

We wish to present this subject as strongly as possible, because we think it of great importance. Its importance is threefold: First. Because a gain of 100 miles in a trunk line from New York to the center of the Ohio valley is a positive gain to the whole commerce and transportation of the country. Second. Because it will at once give Cincinnati the control or the advantage of the whole central traffic of the country; and Third. Because it will be not only the shortest line to Cincinnati, but to all points in the central valley of the Mississippi, to St. Louis, Memphis, and all points connected with them. We have said in a previous article, and now repeat most emphatically, that if the Great Eastern is really 100 miles shorter than the shortest line now in existence, then it will pay a large profit to any company who shall construct it. In this point of view, there has been no road constructed in this country which in its outset promised as large profit as this does. We ask the reader to examine this point. There is no exaggeration or mistake in the proposition we have laid down. Look at the great expense and difficulty by which, after years of struggle, the Pennsylvania road secured the cut-off called the Panhandle, and the control of the Pittsburg & Cincinnati and the Little Miami Railroad. But the result of all this is, that at this time the Pennsylvania road carries three-fourths of all the passengers between New York and the valley of the Ohio. But that was gained by only 100 miles gain on the

Erie and 30 on the Baltimore road. If, then, we say, the Great Eastern gains 100 miles on the shortest line between Cincinnati and New York, it will assuredly command the great body of trade between New York and the valley of the Ohio. Now the actual gain, by surveys made, over the existing trunk lines is:

New York Central.....	880 miles.
“ via Erie & Gt. Western.....	861 “
“ “ Baltimore & Ohio.....	777 “
“ “ Pennsylvania road.....	746 “
“ “ Kentucky & Gt. East.....	640 “
Gain over the Central.....	240 miles.
“ “ Erie.....	221 “
“ “ Baltimore & Ohio.....	137 “
“ “ Pennsylvania.....	106 “

Here we see the fact established of 106 miles gain over the very shortest line! Further the grades are less than those of the Pennsylvania or Baltimore roads. The Report says:

“The whole distance from the city of Cincinnati being *six hundred and forty miles*, with maximum grades going east from Cincinnati to Catlettsburg one hundred and thirty miles, of *fifteen feet* to the mile; from Catlettsburg east one hundred and forty miles, *twenty-six feet* to the mile; and the next one hundred and thirty-eight miles of *fifty-two feet* to the mile.”

These being the facts, there can not be any competition, in through traffic, between the Great Eastern and any other line. Now, let us endeavor for a moment to form some idea of what the business of this road may be. The Report gives an estimate on this point, but we have a way of our own. The three roads, viz: the Atlantic & Great Western (in Ohio 350 miles), the Chicago & Pittsburg (in Ohio 250 miles), and Pittsburg & St. Louis (in Ohio 350 miles), having 950 miles in Ohio, carried 5,400,000 tons of freight, and received for it \$11,923,000. This gives 6,000 tons of freight and \$13,100 per mile for receipts. If, then, we consider the Great Eastern entirely made to New York, 640 miles, this will give 3,840,000 tons of freight, and \$8,384,000 receipts from that source. Again, these roads carried 4,095,940 passengers, or 4,311 per mile, and received therefor \$5,482,751, or \$5,800 per mile. This, on a road of 640 miles, gives \$3,712,000. This gives a total result of \$12,096,000.

Operating expenses.....	\$7,862,400
Net profits.....	4,233,600
Supposing it costs \$40,000 per mile	
it is.....	25,600,000
A dividend of 8 per cent.....	2,048,000

It it will be observed that this is not half the estimated profits. Hence, if the gross receipts of the road should not exceed two-thirds the estimate, the net profits would yet pay a handsome dividend. In point of fact, we know that an entirely new road takes four or five years to be fully developed. We should not, therefore, calculate on more than two-thirds the above estimate. In the report of the company, just published, the president makes both the receipts and the cost less than

we do, but, on the other hand, takes only the new road. We prefer to consider it as a whole, from New York to Cincinnati, for it is in that aspect only it can be a great success.

The estimates of the company we give in full below, that they may be compared with ours. We have made ours on actual results of similar roads, which we consider the safest mode.

“By careful and reconsidered estimates, with a large allowance for contingencies, it is found that the road from Cincinnati to the Pennsylvania and New Jersey connection, a distance of 498 miles, will cost \$35,000 per mile, well built, thoroughly ballasted, and with stone culverts, iron bridges, station houses, depots, machine shops, and an equipment adequate to a very large traffic, making a total cost of \$17,430,000.

“The road thus completed it is computed will earn from local sources alone, free from all rents for bridge crossing or tunnel rights, or use of other lines, the gross sum of ten thousand dollars (\$10,000) per mile a year. In addition to this, its through business will equal, at a low estimate, seven thousand dollars (\$7,000) per mile per annum, which (omitting its business from lateral lines) gives a total earning power of seventeen thousand dollars (\$17,000) per mile, or an aggregate of \$8,466,000.

“Its operating expenses, both by comparison and estimate, considering the absence of climatic difficulties, will not exceed sixty per cent. of its gross receipts, but we estimate it at sixty five per cent., which makes the gross sum of \$5,502,900, leaving an excess of \$2,963,100.”

In the estimate of the company too much stress is, in our opinion, laid on local traffic, and not enough on through. Our reason is this: Eastern Kentucky and Western Virginia is a sparsely settled country, and without large towns. Its great abundance of coal and iron is met by the competition of the same articles on the Ohio side, and in Indiana and Southern Kentucky. On the other hand, we think, as we have said, that the shortening the distance between New York and Cincinnati, and Memphis, and St. Louis, 100 miles, is a matter of incalculable value; make the road of easy grades, and save 100 miles, and the great bulk of the Eastern Atlantic traffic with the Ohio valley will go over the Great Eastern. We predict this in advance, without any fear that future events will contradict our prediction. We have written our views of this enterprise without any interest whatever to bias us. We did not know of its existence, till the enterprise burst upon us with the maturity of at least a thoroughly digested plan. We find in its list of directors, Gen. FREMONT, Gen. BANKS, Col. MORTON, and Wm. P. CUTLER, names which ought to give confidence to any work whatever. We trust they may succeed, and there will certainly be no difficulty in getting the money, if anything we have said here is true. We know it may be said there are four trunk lines at this moment between the East and the West. Certainly, that is just it. Each one of these lines is this day over-

whelmed with business, and each one of them is so rich that they are buying and gobbling up all the continuances they can get over the whole country. It is proof positive that other lines are needed, and they really are, in order to make proper competition, if nothing else. In fact, we look to the time when there will be two or three other great trunk lines to the Eastern Atlantic. Let the Kentucky & Great Eastern step in and take the cream of the coming harvest.

Interesting Letter from Maysville.

RAILROAD IMPROVEMENTS—VISIT OF GENERAL FREMONT, ETC.

MAYSVILLE, Ky., Aug. 28, 1871.

EDS. RAILROAD RECORD:

The good people of this town are in a state of ferment over the prospects of having a railroad which will place them in connection with the rest of mankind. This is not to be wondered at when we consider two things: first, the state of the river, which prevents boats from reaching here with any regularity, being frequently not less than twenty hours from Cincinnati; and second, the importance of the line of railroad that is proposed to be constructed, to say nothing of all the advantages that it is well known must accrue from the success of such an improvement.

This place has a railroad history, but like many others, it is not such an one as is particularly pleasant to refer to; or, in other words, its railroad interests are in history, and not in living roads. But the people are nevertheless full of hope that their early efforts in this direction are about to be made valuable to them, and they have taken hold of the cause again with new zeal, and with the strength of desperation.

They are warranted in this by all the circumstances as we understand them. It is the first time that the project has been undertaken by a strong company, made up principally of experienced railroad men and capitalists. This commands the confidence of the people. And the proposal to place this old work in a road that is to be a short line from the main business centers of the West to New York, and, by connections, with Washington, Baltimore, Philadelphia and Boston, gives it a value beyond anything that was ever expected of it. Before, it had little or nothing but mere local significance, now it rises to the importance that can only be had in a great and prosperous national thoroughfare.

Besides, the proposition of the new company to the people of this county for aid is such an one as almost forbids opposition. It meets every objection to such movements by its fairness and the absolute security which the people have against the payment of money without the promised return therefor. The

more the subject is discussed here, the more popular the measure becomes, and the largest vote is predicted for the \$100,000 subscription to the capital stock of the Kentucky & Great Eastern company ever cast for anything of the sort in Mason county.

The recent visit here of General Fremont, and the railroad gentlemen who accompanied him inspired the people with great confidence in the capacity and good faith of the company. I think it did more to unite these people upon the enterprise than anything else could have done. They say such men mean business, and that, too, of the right sort, and it also exhibited an appreciation of the work and the people of the place and the county, all of which is an appeal to the ruling feelings hereabouts. This visit is often spoken of, and always with a great deal of satisfaction. The guests made a good impression here, and if they appreciate the people of Maysville as much as they are respected by them (and we have reason to know they do), the foundation is substantially laid for very pleasant and we believe profitable relations.

When one looks about this place, as we have done, with a view to the new life that is about to be infused into it, we are astonished at the great natural advantages this locality possesses for the making of a first-class city. It is well located upon the Ohio river, and is the business center of one of the most fertile sections of country in the whole West. A body of land lies back of this place (for the products of which it is the natural outlet) that possesses a substratum of limestone, so freighted with the qualities exhausted by heavy cropping that it supplies the waste and keeps the soil as rich and lively as it was in its virgin state. There is absolutely no starving it out: nature's great renovator is here in its highest condition, and is incessantly at work for the good of the fortunate owners of these beautifully faced, well tilled and most charmingly wooded and watered acres. Such a country has the capacity to sustain a population as that of England, or even Belgium, and feed every one well. It is no wonder that every year there passes into the avenues of commerce from this section of country such an enormous tonnage of freight, and so large a number of horses, cattle and mules, as the statistics give it credit for. And yet, strange to say, its richest resources are undeveloped, though well known and thoroughly appreciated by the people.

Within twenty-five miles of this place lie embosomed in a range of hills great seams of coal of the highest purity, and of the best quality for smelting the immense deposits of iron ore that are deposited near them. They are within easy reach of the miner, and so placed as to be removed at but little cost. There can be no doubt of their value; tests of every kind, and by parties experienced in the working of such materials, have been applied

to them, and they stand attested as being without superiors upon the continent. This is a *huge* recommendation, but we are convinced it is deserved, and will be sustained, if ever these mines are called into practical operation.

It is a reasonable wonder, therefore, why this coal and iron have not been brought to this city and here worked into articles of commerce, and thus made to sustain a score or more of manufactories, that would require the labor of a couple of thousand artisans, who, with their families and the natural increase of population incident to such a result, would add at least five or six thousand more people to this city, and who could all be fed so cheaply from the products of the agricultural part of this country. To our mind this wonder is not very easily set aside. Such rare combinations usually bring about these results, and we can't see why they should not do so here.

If this had been done, Maysville to-day would have twenty thousand people. She would be infinitely richer than she now is. Her taxable property would be ten times its present sum, and the annual payment required upon it much easier paid than is the much smaller sum required now. A large share of the farmer's products would be consumed at home, at good prices, and the best of facilities for transportation supplied for taking the balance to other consuming localities. The lands of this section of country would be largely increased in value, and the people generally would enjoy a higher prosperity.

It is not our province to account for this state of things, though we have our theory of the whole matter. But we very naturally inquire whether they are to continue thus or not. And if not, we suppose it will be because some new commercial element will be introduced here. It is pretty evident that, without this, affairs will go on very much in the future as they have in the past.

This new stimulus is expected in the coming railway, concerning which the people here are so deeply moved. There can be no doubt about it. This magnificent line of road is exactly what is wanted to bring in capital, and shrewd, experienced, money-making men, who will be quick to see the great manufacturing advantages of this locality, and the vast industrial resources that sleep hard-by, and who will not be long in bringing them here and starting manufactories that will be ceaseless in their productions of articles of commerce, so valuable that they will be sent eastward to the sea front, and into all the vast interior that lies west and south of this point, and is so extensive as to afford a profitable traffic to the great thoroughfare that will call them into existence.

We would like to visit this place again at the close of the first decade after the completion of this contemplated railway. The change

would be so great that it would only be recognized by its position and such substantial interests as the demands of commerce would not require changed, that are time-honored and venerable. And we would then like to ask the people of Mason county what sum of money they would take and be deprived of this great improvement that had sent such life into all their material affairs, and had placed them in contact with all the world, relieved them from their isolation, and that was adding to their comfort and prosperity every hour. It is sheer folly to think even of such a deprivation. It would be like attempting to force the world back into the state of one of its past geologic periods, there is no sum of money that can pay a man for his life, and there is no amount that could induce a community to part with a railway once established, because it is its business, and, to a large extent, its social life.

This, perhaps, is a very good way to consider the question now. These people are asked by the company that proposes to construct this commercial artery, for the sum of four hundred thousand dollars, not as a contribution but as an investment that promises large profits. Now the question they should ask themselves is, not what we can afford to do in our condition to-day, but when we are in that active, life-giving, vigorous state that this work will place us. Or, in other words, having the road with all its advantages and connections established, which the investment secures, what would we take and be reinstated in the condition of to-day. The difference between the sum paid and that asked is the profit of the transaction, and we venture to say it will be so enormously profitable, that the most obtuse citizen could see it and be willing that it should be made.

From all that I can see and learn, I am convinced that the people appreciate this railway scheme. The farmer has argued himself into the belief that it will enable him to get away his mules and cattle and grain quicker and cheaper than he now can, and without passing over the roads of three or four different companies, and being subject to costly delays and expensive handlings. The merchant sees his profit in the prosperity of the farmers, the moneyed man his gains in active capital, and the laborer his living in the assurance of steady employment and good pay. In all this they are right, except, perhaps, their estimates are below what the reality will demonstrate. Because of this general recognition of the value and effects of this proposed work, it is believed by those intelligent upon the subject that the proposed subscription of the county will be carried by a very handsome majority.

I shall ramble about this part of the world a few days yet, and if I see or hear anything suitable for your journal you will hear from me again. Until then, adieu!

TRAVELER.

"An Efficient Fire Department."

FROM E. G. MEGRUE, CHIEF ENGINEER, CINCINNATI FIRE DEPARTMENT:

CINCINNATI, Aug. 11, 1871.

To H. J. Bond, General Agent Babcock Fire Extinguisher, 22 West Fourth St.:

After a careful observation of the practical workings of the Babcock Fire Extinguisher for several years past, I am fully convinced that their general adoption in manufactories, public buildings, hotels, residences, &c., would result in saving to our community annually large pecuniary losses, and also afford us far greater security from fire than we now enjoy.

They have already rendered valuable services in connection with our Fire Department in many instances, especially at the fire in the block of buildings on the corner of Vine and Fifth streets, where, by their use, a heavy stock of clothing, hats, caps, &c., was saved from damage by water.

A sufficient number of extinguishers, with a proper organization, would make an efficient fire department for towns and villages. I heartily recommend their general use as a protection against loss by fire and water.

Very truly, E. G. MEGRUE,
Chief Engineer Cincinnati Fire Dept

Railroads of the United States.

PROGRESS AND AMOUNT OF THEIR EARNINGS AND TONNAGE TRAFFIC.

The rapidity of the increase of earnings of the railroads of the United States, and of the quantity and value of their tonnage traffic, is still more remarkable than the rapid progress of these works. Their tonnage, which last year exceeded 125,000,000 tons, has been almost wholly created by them since 1851, the year of the opening of the Erie Railroad, and the removal of canal tolls from the New York Central line. The earnings of all the roads in the United States that year were \$39,466,358; the earnings from freight being \$20,192,404, as shown in the following statement:

States.	Miles of railroad in operation.	Earnings from pass'rs.	Earnings from freight.	Total earnings.
Maine.....	284	\$365,476	\$219,941	\$585,417
New Hampshire.....	415	537,901	686,103	1,224,004
Vermont.....	374	362,375	518,100	880,475
Massachusetts.....	1,167	3,821,675	3,233,139	7,054,814
Rhode Island.....	50	128,433	79,205	207,638
Connecticut.....	253	1,308,704	853,948	2,162,652
New York.....	1,765	4,810,431	2,841,849	7,652,280
New Jersey.....	269	1,731,662	901,157	2,632,819
Pennsylvania.....	893	1,836,682	4,161,297	5,997,979
Delaware.....	16	135,129	2,177	137,306
Maryland.....	324	65,857	1,405,517	2,069,114
Virginia.....	441	466,033	489,594	955,627
North Carolina.....	249	330,609	310,809	641,418
South Carolina.....	241	331,576	667,141	998,717
Georgia.....	658	432,669	1,386,592	1,819,261
Alabama.....	88	91,232	83,322	174,554
Mississippi.....	50	90,000	60,000	150,000
Louisiana.....	50	70,110	70,000	140,000
Kentucky.....	93	97,412	134,972	232,384
Ohio.....	638	990,610	940,382	1,930,992
Indiana.....	86	109,589	245,047	354,636
Illinois.....	116	147,676	18,634	166,310
Michigan.....	357	550,583	710,168	1,260,751
		8,876	\$19,274,254	\$20,192,104
				\$39,466,358

The total earnings of the 50,000 miles of railroads in operation in the United States the past year, at \$9,000 per mile of line, equaled \$450,000,000. The increase in 20 years equaled \$400,000,000, or \$20,000,000 annually.—*Poor's R. R. Jour.*

Important Decision.

THE DAYTON TUNNEL RAILROAD—ORDER OF SALE SET ASIDE AND DISMISSAL OF RECEIVER—FIRST SUIT UNDER THE CAPITALIZATION ACT OF 1863.

HAGANS, J.—George E. Donner et al. vs. The Dayton & Cincinnati Railroad Company. In Chambers. This cause, in which a judgment was heretofore pronounced and decree entered, now comes up on an order for sale in the hands of the Receiver, and substantially upon a motion by the defendant, filed May 1, 1871, to dismiss the proceedings appointing the Receiver and to discharge the said Receiver, on the ground that two-thirds of each class of the creditors of the company, did, on the 28th February, 1871, agree in writing upon a plan for the adjustment of its indebtedness by capitalization, by virtue of an act of the Legislature passed April 7, 1863, entitled "an act to provide for the adjustment of the affairs of insolvent railroad companies and for their reorganization without a sale of the property thereof." (S & S, 126.) This agreement was filed on the 3d March, 1871, in the office of the Secretary of State, who certified thereto, as well as pursued the other requirement of the act as to the publication of notice of the making and filing of such agreement. It was also alleged that the Company kept a duplicate of said agreement at its principal office in this city under the third section of the act referred to. In fact, an entry granting the motion was made at the June Term, 1871, but a motion was made and granted setting that entry aside, and now a motion is pending to set aside this last entry. Upon the hearing the defendant produced the certificate of the Secretary of State, and claimed that it was sufficient and conclusive proof that the provisions of the statute had been complied with, and demanded that the motion be granted.

After copying the agreement, the Hon. Isaac R. Sherwood, the Secretary of State, certifies "that the foregoing is a true copy of the agreement between certain of the creditors and stockholders of the Dayton & Cincinnati Railroad Company, whose names are thereto subscribed upon a plan for the adjustment of the indebtedness of said company by capitalization, filed in this office on the 3d day of March, 1871." He then certifies to the fact of the publication of the necessary notices. The act nowhere requires the Secretary of State to issue such a certificate. Nor does it confer upon him any judicial power to determine the fact or the sufficiency of the necessary agreement, or of the notices. His duty in these respects is wholly official and formal. The fifth section of the act requires proof to be made "in the Court where such proceedings are pending," that the agreement has been made, filed, and notice thereof given, before "it shall be the duty of the Court to dismiss the same."

It seemed to me, therefore, that this was clearly a case in which the Court should hear proof of every thing made necessary by the act, as the predicate of the exercise of the power to dismiss the proceedings conferred by it, and accordingly the proof was gone into at great length.

The resistance to the motion is upon the part of several comparatively small judgment creditors and the Dayton & Eastern Railroad Company. The rights of the latter were determined by the judgment of this Court in General Term. (1 Sup. Ct. Rep. 130.) That

Company has no longer any substantial interest in the controversy until that judgment shall be reversed. The bonds which it held are satisfied, and ought to be canceled.

It is not seriously disputed that the conditions as to the pendency of proceedings for sale and a Receiver named in the first section, upon which it is made lawful for the creditors of the Company to capitalize its indebtedness, exist. But it is said that the act, taking its whole scope and extent, is unconstitutional, because the private property of those who resist this motion is proposed to be taken—going on the hypothesis that the provisions of the act are compulsory as to them—without compensation, and that the act impairs the validity of their contract. To say nothing of the claim made that this is a statute like the statute of limitations, or that it affects the remedies, not the rights of the plaintiffs, it seems to me that this is not the time to urge this view of the act. It will be time enough when it is proposed to bar these plaintiffs of their interest and rights. Certainly, on the part of those who have assented to the scheme of capitalization, no objection on this ground can be made. It is entirely constitutional that they may not only perfect but proceed with the scheme, if there be two-thirds of each class of creditors and they have otherwise complied with the provisions of the act; and if they choose to incur the risk of leaving these plaintiffs to assert whatever rights they have in such form and at such time as they please, there is no reason to object. And when these plaintiffs do assert them, it will be time enough to consider the constitutionality of these parts of the act which they allege affect them injuriously. The whole act is not unconstitutional, even if it be admitted that part of it is. One part of a section may be unconstitutional, and another part valid, and must be sustained. The point is not whether the constitutional or unconstitutional provisions are in the same act or in the same section, but whether they are essentially or inseparably connected in substance.

Cooley's Const. Lim., 177 et seq.

Sedgwick's Stat. and Const. Law, 489, and cases cited.

This statute proposes to accomplish a single object, and it it be admitted that some of its provisions are void, still if enough remain to reach the end intended, as stated in the title of the act, it must be enforced and then proceedings be dismissed. If the provisions of the act are not so mutually dependent as to warrant the belief that the Legislature would not have passed the residue independently, then what is good in the act must stand. Applying these tests, I see no reason to interfere with this agreement on this ground.

The essential conditions upon which the action of the Court is to be based, are found in the first and fifth sections of the act. It must appear first, that judicial proceedings are pending for the sale—not for the order for the sale—of the road, and that the same is in the hands of a Receiver.

2. Two-thirds in interest in each class of creditors must have agreed in writing upon a plan of adjustment of the indebtedness by capitalization; and

3. It must be proved in the Court where such proceedings are pending that such agreement has been made, filed with the Secretary of State, and notice thereof given.

Some stress was laid upon the claim that no duplicate of the agreement was kept at the principal office of the Company, according to

the provisions of the third section of the act. The original agreement, with the autograph of creditors, is on file in the office of the Secretary of State. It was in testimony that a copy of that paper, including the signatures, was kept in the office of the Company, as a duplicate, for the signature of other creditors, some of whom have actually signed it; and it was proved that the signatures to the original document were genuine. Both the certified copy of the Secretary of State, and the copy kept in the office of the Company, as a duplicate, were in evidence. Those who signed the duplicate made no objection to it on the ground that it was a copy. In fact, they are bound by the agreement. Nor do the parties here object to signing it on that ground. No harm results to these plaintiffs by the substitution of a copy of the agreement for the duplicate mentioned by the act. It is urged that these plaintiffs have a right to see the genuine autographs, to assure themselves of the *bona fides* of the agreement. The proof is ample to that fact. The provision as to the duplicate is directory merely. No negative words are employed in the act, which expressly or by implication forbid any other manner of accomplishing the purpose of that section. In fact, the substantial purpose of the statute was accomplished; and what was done was therefore sufficient, though not done in the precise mode mentioned in the act. As already indicated, the keeping of a duplicate of the agreement at the office of the Company, is not made by the act a condition precedent to the action of the Court. The precise mode is not made essential to the validity of the agreement of capitalization, but has reference rather to what occurs after it is complete, and to what may occur even after the action of the Court.

Let us now inquire whether the conditions precedent to the action of the Court have been performed.

It is not disputed that proceedings are pending for the sale of the road, and that it is in the hands of a Receiver. This I have designated as the first condition.

The second condition relates to the agreement. It is agreed that it was made, but objections are taken to its sufficiency and validity. The agreement recites the pendency of proceedings appointing a Receiver for the sale of the road, and the necessity for the adjustment of the affairs of the Company, and a reorganization without a sale.

The basis of capitalization and amounts of stock, debts, etc., have been before published in the RECORD.

It is objected, first, that there is no sufficient classification. The plaintiffs are judgment creditors, and there is no such class; but it will be seen that the act puts "all other classes" together in one class, as distinguished from "each class of mortgages" and the "stockholders." Taking an equitable view of the application of the statute, which, being remedial, may well be done, and construing a statute of this nature liberally, and considering the nature and justice of the claims upon which these judgments are founded, as compared with other claims in the agreement, and there does not appear to be any sufficient ground to erect a class for these judgment creditors alone, for which the statute does not itself provide.

Again, it is objected and proved that a number of the signatures of stockholders to the agreement are made by James Goodin, purporting to act as their attorney. Quite a number of the persons, whose names are well

known, thus appear, some of whom are living and some had deceased long before the agreement was executed. Without the stock of those living, at least, there are not the requisite two-thirds of stock. But the Company produced the power of attorney, or proxy, under which Goodin claimed to act.

The popular acceptance of the word "proxy" is representation of a stockholder of a moneyed corporation at elections for directors or trustees. It is in this sense that the Legislature, in various acts, uses the word. In the absence of legislation expressly authorizing stockholders of such a corporation to vote by proxy, it may be that the power to do so is incidental.

Angel & Ames on Corp., section 493, and cases. But this act (sections 3 and 4), under which this motion is heard, uses the word in a different sense, and provides that creditors other than those signing the agreement may come into the arrangement "in person or by proxy." Whether the act authorizes the parties to this agreement, when made, to act by such a proxy as is named in those sections, or whether the Goodin proxy be a power of attorney coupled with an interest, and, therefore, as it states on its face, irrevocable until eighteen months after the tunnel is completed, does not seem material to determine. Nor does the objection seem well founded that the signers to this Power of Attorney, who executed it in 1859, could not have intended Goodin to represent them in an act authorized by legislation in 1863. For when we come to consider the object for which this paper was executed, and of the important powers conferred by it upon Mr. Goodin, viz: the completion of the tunnel in which these parties had invested largely of their means, any particular act to be done by the attorney to that end must be held under the circumstances to have been on their contemplation. It appeared in evidence that before the original agreement was filed with the Secretary of State, and the notices given, those signers of the proxy who were living at the time Goodin assumed to act, assented to, approved and ratified his execution of the agreement for them. Thus they made his act their own. Not one of these appeared in Court to disavow the act of Goodin, their attorney, though perhaps all of them were in reach of the process, and some of them actually present during the hearing of the motion. This is true of those who still hold the stock represented in the proxy, as well as of those to whom stock therein has been since transferred. It is not claimed that any of these did not or do not fully understand the nature, scope and effect of the act ratified; and inasmuch as this act of Goodin's is not disavowed, but ratified, they will be estopped from denying his authority.

1 Parsons on Cont., 49-51.

McCully vs. The Pitts. & Conn. R. R., 32 Pa. St. 25.

Bredin vs. Dubarry, 14 S. & R., 27. Bingham vs. Peters, 1 Gray, 139. Ish vs. Crane, etc., 8th Ohio St., 520.

Some question was made at the bearing as to the amount of the outstanding stock. The books of the Company seem to be in hopeless confusion on this subject, as well as upon the other question, whether all the stock out has been paid for. It seems, however, that is the most satisfactory, and indeed the only, course to pursue, which the Company took, viz: to take the stubs of the stock book as the best evidence of the stock outstanding, and that the Company had received payment therefor in some satisfactory form. From a more

careful examination of these stubs, it appears that the actual number of shares out is 7,787, or \$389,350, being 672 shares less than the statement in the agreement. Two-thirds of the stock would be 5,191 $\frac{1}{3}$ shares, or \$259,566 67. It appears that 2,225 shares signed the agreement personally, and 3,707 shares by proxy, and ratified, making a total of 5,932 shares, or more than two-thirds of the stock by 740 $\frac{2}{3}$ shares. It was said by the plaintiffs that they stood upon the statements of the agreement as to the number of outstanding shares, and that the Company was bound thereby. But I don't see the force of the claim, especially when it was at their instance that the inquiry into the true state of affairs was gone into, and they must be bound by the truth.

A very large part of the testimony and argument went to the *claims* by judgment, and otherwise which are properly put in one class in the agreement. It was asserted that the costs of the suit and the fees and expenses of the Receivers, amounting in all to some \$3,000 to \$5,000, should be included in the estimate of claims. But I think not. These must be paid in full, and are by the fifth section of the statute expressly to be provided for. Two other claims against the Company were presented, amounting in the aggregate to some \$5,000, which do not appear in the estimate made. But these are and have been disputed by the Company, and I do not see how, on the hearing of this motion, I am to determine their propriety or impropriety, if as here, the dispute appears to be *bona fide*. It would seem that the true construction of the words, "creditors of such Company," two-thirds in interest of which are to execute the agreement, must mean *admitted creditors*, or those whose claims are fairly indisputable, and those that are in judgment or decree. So holding, does not cut these creditors off from asserting their claims in a proper way, and, if successful, assenting to the capitalization, or otherwise, if they choose. The whole amount of claims stated in the agreement is \$42,979 78—though Mr. Hodder states it at \$39,679 78—two thirds of which is \$28,653 18. The holders of claims amounting to \$31,171 have signed the agreement, or \$2,517 82 more than sufficient.

It is argued that this sum of \$31,171 is made up of claims admitted by the Company; it is true, but claims that were "got up" for the purposes of the agreement, and some of them allowed by the Company fraudulently or by undue partiality, and that some of the claims allowed were contracted by the Company while its affairs were in the hands of the Receiver. It may be, and, perhaps, is, true, that the claims were allowed for the purposes of the agreement; but I do not see that this of itself should therefore vitiate the agreement. Some of them do not seem to have been presented to the Company until the scheme of capitalization was resolved upon. That the Company should then have cast about to ascertain the true amount of its indebtedness does not appear to be wrong, but a necessity under the act; and its action was therefore laudable and proper.

The Court then at considerable length states the action of the special committee in the review and allowance of the claims referred to, and also the objections made to them, and concludes that the committee in no wise transcended their duty, and that their action was in all respects what it ought to be.

The question of the custody of the unis-

sued bonds was duly considered by the Court, and declared to be the property of the Company, and ought to be in the hands of its officers.

And this elaborate and very able decision concludes with the following paragraphs:

It has not escaped my attention that no one has said a word against the policy of such an agreement of capitalization as is in proof here. On the contrary, such is the interest manifested by all the parties to this suit in an enterprise which has languished for so many years, and into which so much hard cash has been put to little purpose thus far, that anything which fairly promises the completion of a road both valuable and vital to the public welfare would meet the approval of these plaintiffs; and the Company does not appear to have acted unadvisedly, improvidently, or without due deliberation, but with a real purpose to complete the enterprise.

As this is the first case that has presented itself in the State under this act I have given every question a careful consideration. The act itself demands a liberal construction where necessary, because it is remedial. The idea of a natural equity in such a case is upheld and approved by the greatest authorities both in this country and in England; and if any case deserves the application of this rule, it is the present one, as it now appears.

The motion will be granted

General J. D. Cox, Warden & Ludlow, for the motion; Judge Caldwell, T. C. Ware and Wm. Tilden, contra.

WROUGHT IRON TIES.—An English scientific journal makes the following interesting statements: The new railway sleeper which has lately been brought forward in England, is likely, it is thought, to prove of special advantage in some respects, and particularly in tropical countries. The constructors of the various railways in India, for example, experience the greatest difficulty in making and maintaining the permanent way. The dry rot, and those pests of India, the white ant, are terribly destructive. Sleepers sent from England creosoted and "pickled" are not protected from the influence of the sun and vermin, and seldom or never last more than three years. It was necessary, therefore, to find a substitute impervious to the attacks of insects, which might be made perfect and ready to be laid down wherever and whenever required. The new sleeper is made up of a number of webs and plates of rolled iron, riveted together, and pierced with bolt holes for the chairs. This is estimated to save about two-thirds of the labor of laying, and leaves but little work to be done by native or other labor. The direct cost is found to be not more than one shilling each, above that of the best wooden sleeper, and they are calculated to last ten times as long in tropical countries, and three times as long in Europe. Many eminent engineers and railway constructors, who have examined these sleepers, express great confidence in their superior adaptation.

Statistics for the quarter ending June 30, 1871, show a somewhat remarkable turn in the tide of European immigration. The number of actual immigrants arrived at the port of New York during the period mentioned was 101,015, of whom 30,814 were natives of Germany, 26,149 were from Ireland, and 29,529 from England and other British localities. The number arrived at Boston during the quarter was 10,442.

Nitro-Glycerine.

SATISFACTORY TEST AT PILOT KNOB.

The following, from the *St. Louis Journal of Commerce*, shows some curious facts:

The rapid development of the mining interests of Missouri have induced the enterprising mine proprietors, in keeping pace with the "march of improvement," to employ not only the Diamond drill, but a more powerful explosive than powder. We have the diamond drill at work at several mines in this State, very satisfactorily performing the same labor at one-tenth the cost and in fully one-tenth the time required by hand.

The next great desideratum is an explosive agent, which can be more safely handled, and that will be more economical and effective than gunpowder, or the ordinary blasting powders.

A few days ago, we announced the presence in the city of Dr. Carl W. Volney, the efficient and accomplished representative of the Lake Shore Nitro-Glycerine Company (of Painesville, Ohio), who had just finished the work of driving a tunnel through the hard lithographic limestone 300 feet, at Hannibal, to secure an approach to the new bridge. The result was that Dr. Volney was at once engaged to make a practical test for the Pilot Knob Company, and orders were given by President McCune, that the proper arrangements be made, either at Pilot Knob or Shepherd Mountain, to give a severe test.

Mining, being one of the specialties of the *Journal*, our mining editor accompanied Dr. Volney to Pilot Knob, to witness the test, and is therefore able, as an eyewitness, to give the result. On Monday two holes that had previously drilled in solid iron ore for powder—say 2 inches in diameter and from 8 to 9 feet deep—The burthen of these were from 8 to 9 feet, and the iron ore was cleaned off—probably from 100 to 150 tons in each case, and the ore broken so small that block holing or further reduction could be dispensed with. All who were present were greatly astonished with the result, and with the power of this great explosive.

But the most astonishing result was attained in blasting in the hard porphyry, where a hole had been drilled only 2 inches in diameter, and 7 feet deep, with a burthen of about 10 feet. The explosion was truly terrific! It not only broke off all the solid rock in front, and on either side, but to a depth of 15 feet below the hole, and shattered and loosened the previously solid rock some 6 or 8 feet back of the hole—thus really cracking the rock in the rear and on both sides, in an area of probably 30 feet.

Hundreds of tons of rock and ore were thus thrown down by each of these explosions, proving satisfactorily that this is the most effective and powerful explosive agent ever used in this region.

The Arcadia House is fully two miles from the location where the test was made, yet Mr. Robinson of the Arcadia Hotel, and several citizens of Ironton, state that they distinctly felt the shock of the explosion.

The holes used for these tests had been drilled for powder, and were not of proper proportions. Had they been drilled for this purpose, there should have been 12 or 15 feet greater burthen—the holes should have been 20 to 30 feet from the edge of the rock or iron.

Several points were satisfactorily decided: 1. That nitro-glycerine is at least twelve times


more powerful than powder; 2. That one-half the drilling can be saved by its use; 3. That there is no ore or rock that can not be moved by it; 4. That it can be handled with safety by those who understand it.


The Lake Shore Nitro-Glycerine Company, of Painesville, Ohio, have already used it successfully in driving the tunnel through at Hannibal, and in mining operations at Lake Superior during the past two years.


We have heretofore withheld our endorsement, because it has been considered very dangerous, either in transportation or in handling. But in the occasion before us, we notice that the ingredients of which this explosive is composed are kept entirely separate until they are needed for use, when they are brought together. Until this combination, there is no more danger than from the breaking of a can of nitric or sulphuric acid. Dr. Volney's plan is to erect a sled at the mines, remote from any other buildings, where small quantities can be prepared, and thus the risk and danger are avoided; and as he has used it probably more extensively than any other person in this country, and with greater success, we have confidence in the results as foreshadowed by him.

We anticipate as a result of this practical test, that our miners who have large masses of iron ore to blast, and railroad contractors, will be interested in employing this most powerful agency.

One feature that will be of interest is this: The nitro-glycerine can be graduated, so that a light charge will merely crack or loosen the rock, or break it into small pieces as may be desired. It is hardly necessary to say that the last charge, in the porphyry rock of Pilot Knob, was a large one, and that the result was the most astonishing of any ever made in this State!

 The amount of money sent across the water by immigrants to friends left behind, principally to pay their passage to America, is rather surprising. From the official returns of the Emigrant Commissioners of England, it appears that in 1870 there was sent from this country, to Ireland principally, \$3,630,000 in gold, of which \$1,663,190 was for prepaid passages. In the twenty-three years from 1848 to 1870, inclusive, it was upward of \$81,670,000 in gold, being an average of about \$3,889,047 yearly. But this amount is probably somewhat below the actual amount sent, as it only includes what has been sent through banks and commercial houses. Of whatever may have been sent through private channels there is no knowledge. And these sums, large as they are, are made up by careful savings from the wages of servant girls and day laborers.

 Statistics of ballooning during the siege of Paris, in the late European war, which have been presented to the French Academy of Sciences, show that 64 balloons left that city between the 23d of September and 26th of January last. They conveyed, besides the 64 aeronauts, 91 passengers, 354 carrier pigeons, about 3,000,000 of letters and a large number of dispatches. Of these balloons, five fell into the hands of the Germans, two were lost at sea, and one crossed the North sea and landed in Norway after a voyage of about 1,600 miles in 45 hours.

 There are 6,000,000,000 cotton spindles now in operation in the United States, of which over 2,000,000,000 are running on cloths for printing, and produce 450,000,000 yards per annum.


The Detroit Tunnel.

The *Detroit Post* states upon authority that work upon the river tunnel will be commenced at once. All the money required has been secured, and organizations have been effected on both sides of the river, which in due time will be consolidated. Mr. Cheesebrough, the engineer of the lake tunnel at Chicago, will have charge of the work.

The plan contemplates really a series of three cylindrical tunnels. Two of these will be for road purposes, each being 18½ feet interior diameter. They will be parallel and 50 feet apart. This plan is deemed preferable to a single tunnel with double tracks, both on account of less liability to accidents and delays, and on account of strength and economy. The third tunnel will only run under the river; will be below and midway between the others; is designed for drainage only, and will have an interior diameter of 5 feet. This third tunnel will be constructed first, in order to fully develop the character of the soil, and to drain the other two as the work progresses. It is expected that the building of the lower tunnel will fully determine the feasibility of the entire project, and this will, therefore, be completed before work is undertaken on the road tunnels proper. If difficulties are met with anywhere, the drainage tunnel will be likely to encounter them, and their nature can then be determined before any great expense is incurred.

Work will be first commenced on the grounds of the Detroit & Milwaukee Company, near the foot of St. Antoine street. Here a shaft, 10 feet in diameter, will be sunk, and excavating under the bed of the river will proceed from that point. As the excavating proceeds a shell of brick masonry will be constructed in a permanent manner. By the time the middle of the river is reached, if the project still appears feasible, operations of a similar character will be commenced on the other side, and the work will proceed from both directions. The building of this experimental and drainage tunnel, it is expected, will not take more than two or three months, so we shall soon know whether the proposed tunnel is possible. On the successful completion of the first, work upon the others will be immediately begun and proceeded with, with all possible dispatch. The engineer estimates that a year and a half or two years will be required to complete the work. Of course much depends upon the results ascertained in the experimental tunnel. If it shall appear that the larger tunnels can unquestionably be built without danger or delay, the work will be pushed with all possible dispatch, and probably completed within a year.

The entire length of the tunnel, not including the approaches, will be about two miles, and its estimated cost nearly \$3,000,000. When completed it will be used by all roads entering the city.

 The total amount of public lands disposed of by the Government is stated at nearly five hundred millions (447,266,080) of acres. Of this amount 106,588,000 have been sold, and the enormous balance of 300,000,000 of acres have been given away for military services, colleges, railroads, canals, wagon roads, schools, asylums, public buildings, etc. According to this statement the amount left is more than a billion and a quarter (1,387,732,356) acres, which includes Alaska—say about fourteen millions of acres—yet to be disposed of.

Journal of Railroad Law.

Railroad Companies—When Liable as Carriers of Goods marked "C. O. D."—Liability terminated by a delivery merely.

The facts in the recent case of *The Chicago & North-western Railway Company vs. Merrill* (48 Ill., 425), are fully and clearly stated in the following opinion by

LAWRENCE, J.—This was an action of assumpsit brought against the railroad company to recover for the value of some castings sent over their road, from Geneva to Winnebago in this State. The goods were marked as follows: "John L. Page, Winnebago, goods by R. R. cars, care of American Express Company, C. O. D.," and were shipped by the railroad with the directions thus marked on them. They were safely delivered to Page upon the freight. He proved insolvent, and Merrill the consignor having failed to recover the price of his goods from him, has brought this suit against the company, and recovered a verdict and judgment in the Circuit Court.

There is no possible ground upon which this judgment can be sustained upon the record before us. We held in the case of the *American Express Company vs. Lesem*, 39 Ill., 313, that in an action against an express company, the plaintiff might aver in his declaration, and prove upon the trial in what sense the characters C. O. D. were used in the business of express companies and what was the usage of those companies in regard to packages thus marked; and what responsibilities assumed by giving a receipt with those characters written upon it. But in the case at bar, although the goods were marked C. O. D. the receipt given by the company contained no such characters, nor any language indicating an undertaking on the part of the company to collect from the consignee the price of the goods. Not only that, but there is not a scintilla of evidence in the record, that this railway company ever undertakes the duties of a collecting agent or that it recognizes the characters C. O. D. when inscribed upon an article of transportation, as imposing upon itself any additional duties or obligations.

And not only was there an entire absence of evidence showing such usage, but the direct reverse was positively proven. Besides all this, it was also shown that no bill for the price of the goods was delivered by the consignor to the company, so that, if it had desired to collect their value from the consignee, upon delivery, it had not the means of doing so.

Under these circumstances, we are utterly unable to see upon what ground the liability of the railroad company can be made to rest. It simply undertook by its receipt to transport these goods to Winnebago, and there safely deliver them to John L. Page, who is named in the receipt as consignee. This it did, and there its liability ended. It is true on the bill was written, besides the name of Page, as consignee, the words "care of American Express Company." But in the receipt given to appellee by the company, Page was named as the consignee, and nothing is said about the express company, and we understand these words upon the box as merely indicating that, if Page, the consignee, could not be found to receive the goods, the appellant might deliver them into the care of the express company. But Page did appear, and claimed the goods, and the appellant delivered them to him as it was his duty to do. And if it could be held that the express com-

pany, and not Page, should be regarded as the consignee of the goods, it appears that the station agent of the railway company at Winnebago, who received the goods, was also the agent of the express company, so that, in either event, the appellant made a proper delivery. The judgment must be reversed.

Judgment reversed.—*Am. R. R. Jour.*

New Cement or Artificial Stone.

Many attempts have been made of late years to manufacture artificial stone, some of which have been attended with more or less success as far as regards the production of large blocks, but have rarely succeeded for the purpose of molding, or making medallions or mosaics, or for emery-wheels, oil-stones, and articles of a similar character. In almost all cases, too, the agency of heat has been required for producing articles in artificial stones, and this has been found very objectionable, as well as expensive. Attention is called to some specimens of artificial stone in the shape of medallions, mosaics, emery-stones, oil-stones, imitation marble, etc., which have been produced in a simple manner, by molding, without the agency of heat, and which appear to partake in every respect of the nature of the stones they are intended to represent. These specimens are formed from natural materials, agglomerated by means of a cement, the invention of M. Sorel, a French chemist, well known in connection with the introduction into this country of the galvanized iron process. This new cement is formed of basic oxychloride of magnesium (carbonate of magnesia and chloride of magnesium), either pure or mixed with other substances. The cement may be made in two different ways, namely, either by diluting or tempering magnesia, which may be more or less hydrated and carbonated, with a solution of chloride of magnesium more or less concentrated; or by adding to the magnesia chloride of magnesium in a dry state, and employing water to form the cement. The cement thus produced is specially white and hard, and may with advantage be used in the place of some of the best cements. It may be made to take any color, and be molded like plaster. It possesses the same hardness, and will receive the same polish as marble, thus enabling it to be employed in the manufacture of artificial marble, mosaic pavements and statuary. Imitation ivory can be made from it for making billiard balls and other similar articles, also medallions, buttons, etc. The agglomerative properties of the cement are of the highest degree, thus enabling the waste and otherwise worthless materials of quarries to be utilized; one part of the new cement will agglomerate thirty parts of sand, chalk, and other materials, the process being of a purely chemical nature. By this means, where building materials are not present, they can be made at a very low cost. Excellent millstones and grindstones can be formed by agglomerating by this cement emery, sandstone, and other hard materials.—*Building News.*

The Commissioner of Internal Revenue is now refunding the tax collected on rope and bagging of each bale of cotton, known as the tare. The cotton tax collected was about \$80,000,000, and the tare tax is about \$3,000,000 of that amount. The refunding is in accordance with an act of Congress.

During the year 1870, Michigan turned out 1,750,000,000 of white pine lumber.

Manufacturing Industries.

The following facts will be interesting to the free traders, who think the country will be ruined by the tariff. It shows the manufactures of cotton at Fall River to have trebled in ten years under the present tariff. Who has that benefited? It has benefited the workmen and farmers. The capitalist at Fall River has only received a fair rate of interest on his money; but the workmen have been employed and the farmers sold their crops:

Statistics of Fall River manufacturing industries show some surprising results of the increase of cotton spinning during the last decade. In 1860 Fall River contained 192,620 spindles, representing a capital of \$2,260,000, and manufactured 45,225,000 yards of cotton per annum. It then had a population of 13,200. Now it has 552,237 spindles, representing a capital of \$6,740,000. There are manufactured annually 132,665,000 yards of cloth. The population, according to the census just taken, is 27,191. In this manufacture are consumed, yearly, 25,253,000 pounds of cotton, 30,000 tons of coal, 52,000 gallons of oil, and 733,500 pounds of starch. Besides the mills engaged in the above named special branch of manufacture, there are the American Print Works, which print annually about 75,000 yards of calico; the Fall River Iron Works, a large and wealthy corporation, devoted to the manufacture of iron; a woolen mill, and several establishments where machinery is made. To meet the financial wants of the community are seven national banks, with a combined capital of \$2,250,000, and four banks, the largest of which has deposits amounting to \$5,000,000.

STONE CEMENT.—Hydrated silica combines much easier with bases than common quartz-sand (anhydrous silica). On this Professor Boettger has based the employment of infusorial earth, a white pulverulent mass, which occurs in various localities in Europe and in this country, in large masses, as the binding ingredient of an excellent cement for stone-work. He mixes equal parts of infusorial earth and oxide of lead (litharge) with one-half the quantity of hydrate of calca (freshly slacked lime) and linseed oil varnish to a homogeneous thick paste, and obtains a mass of extraordinarily great binding power, which after some time assumes the hardness of common sandstone. This cement is applicable in all cases where iron is to be fastened in stone, where artistic stone-work, such as fountains, vases, statuary, etc., is to be mended; in short, where small quantities of the binding material are required. For the more common uses of the mason and stonecutter, this cement is, of course, too dear to permit of extended application.

The tonnage transported by the railroads in 1851 equaled 5,000,000. In 1870, the net tonnage equaled 72,500,000 tons; the increase of tonnage in a period of 20 years equaled 67,500,000, or at the rate of 3,375,000 yearly. The value of the railroad tonnage transported in 1851, at \$150 per ton, equaled \$810,725,200. In 1870, its value, at \$150 per ton, equaled \$10,875,750,000. The total increase of value in this period of twenty years equaled \$10,065,354,800. The annual increase of value equaled \$503,267,740.

A Turn of the Tide.

We commend the following paragraph to Wells & Co., who have been telling about the loss of ship-building in this country. It will doubtless please them, since that has been the great subject of their groans and lamentations:

A shipmaster from New York, superintending the construction of several new steamers on the Clyde, England, in writing home to a friend, speaks encouragingly of the prospects for American ship owners. He says the English shipbuilders are beginning to lose money through our competition. The rivalry, stimulated by the increased demand, is so great that many of the owners of yards on the Clyde are going to the wall, and none but the strongest will be able to hold out against present prices. The price of iron is slowly but steadily advancing; an inferior quality is now in common use, which is often so brittle "that it is absolutely dangerous to throw it off a truck for fear of breaking it;" the price of labor is moving upward, and the work is badly done; there is a continual conflict between workmen and employers; and the underwriters discover that bad workmanship and inferior iron are making the risks upon sea going ships more and more perilous. The American shipmaster who makes these important statements goes on to say that with American mechanics and American material, "we can take the English Lloyd's rules and reduce them 20 per cent., and build a ship stronger, more durable, and consequently more seaworthy, than can now be built in any part of the United Kingdom."

WATERPROOF COMPOSITION FOR WOOD.—Dr. Scherzer, says the *Eastern Budget*, an Austrian official at Pekin, has just sent to his government some specimens of a Chinese composition called "Schioicao," which has the property of making wood and other substances perfectly watertight. He says that he has seen in Pekin wooden chests which had been to St. Petersburg, and had come back uninjured, and that the Chinese use the composition also for covering straw baskets, which are afterward employed in carrying oil for long distances. Cardboard, when covered with the composition, becomes as hard as wood; and most wooden buildings in Pekin have a coating of it. It consists of three parts of blood deprived of its fibrine, four of lime, and a little alum.

Russia imported in 1867, and does nearly every year, about 38,000,000 roubles' worth of raw cotton. But, strange to say, none of this cotton comes from the United States, and the cotton mills of Moscow and St. Petersburg, which run 6,000,000 or 7,000,000 spindles, are almost exclusively fed from the fields of Egypt, Brazil and India.

Russia is planning a grand exhibition to be held in Moscow in 1872, and calls for contributions of manufactures, apparatus, machinery, models, etc. Everything intended for that occasion, provided the sender has the certificate of the committee at Moscow, will be forwarded at half rate and duty free.

The Bank of France has reduced its rate of discount from 6 to 5 per cent., and that has helped to strengthen the tone of the market, which has been buoyant there some time. Many circumstances have combined to effect this.

Good News for Beef Eaters.

For several years beef has been enormously high, but we have hopes it will come down, and poor people can eat meat. The following is from the *Journal of Commerce*:

We have just received information from the inspector that counts all cattle at the Red river crossings, coming north towards Abilene on the Kansas Pacific, that, up the 1st of July, 820,000 cattle had been driven north from Texas this season. All of these, with the exception of perhaps 100,000, will be pastured on the prairies upon the lines of the Kansas Pacific, Union Pacific and Central Branch, and ultimately transported to market by these roads. The wonder is, that such a vast number of beef cattle just upon our border, and within two days' transportation, should not more sensibly affect our retail markets. These cattle can be purchased at about half the price of our stall fed heaves, and the butchers should be able to retail their meat in market at a much lower figure, and still make a fine profit. How is it with the refrigerator cars? Can't they do the same thing and enable the poor man to have his roast or steak without paying quite a day's wages for either.

It appears from the official returns of commerce to the Treasury Department, that the value of domestic exports at the ten principal ports of the United States, during the fiscal year 1870, was as follows:

New York.....	\$209,972,491
New Orleans.....	107,658,042
San Francisco.....	32,186,921
Savannah.....	29,749,058
Mobile.....	22,422,631
Philadelphia.....	16,903,072
Galveston.....	14,869,601
Baltimore.....	14,380,248
Boston.....	12,251,267
Charleston.....	10,772,071

The new St. Clair canal, connecting Lake Huron and the St. Clair river with the Detroit river, is completed. This canal does away with the old time annoyances of navigation in Lake St. Clair, where the channel was the narrowest and crookedest. It consists of two dykes, 7221 feet long by 40 wide, made of sand and clay enclosed in timber frames. Lighthouses are to be placed at each end, and the banks are covered with willows. The canal is 8,421 feet long, 416 feet wide at the entrance, and 300 between the dykes. All the woodwork above water has been treated with carbolic acid, at a cost of \$20,000. The actual cost of the enterprise is about \$428,000.

An instrument has been invented that marks "the ebb of time," showing how many minutes there are prior to any event. If placed in the post office, it reads: "Mails open in 30 minutes;" one minute later it reads "In 29 minutes," then in 28, and so on. At a railway station it reads: "This train leaves in 10 minutes," then in 8, etc., and when the index reaches 0, the train starts. Thus, any passenger, on entering a station, knows just how much time he has got for getting tickets, checks, a newspaper, and a seat, without consulting a watch or a clock to ascertain the hour of the day.

California contains a larger number of foreigners, proportionally, than any other State in the Union. The census shows 336,393 natives and 309,839 foreign born.

WHY CIRCLES PLEASE THE EYE.—Prof. Muller, in a course of lectures in Berlin, offered a simple and mechanical explanation of the universal admiration bestowed on these curves. The eye is moved in its socket by six muscles, of which four are respectively employed to raise, depress, turn to the right, and to the left. The other two have an action contrary to one another, and roll the eye on its axis, or from the outside downward, and inside upward. When an object is presented for inspection, the first act is that of circumvision, or going round the boundary lines, so as to bring consecutively every individual portion of the circumference upon the most delicate and sensitive portion of the retina. Now, if figures bounded by straight lines be presented for inspection, it is obvious that but two of these muscles can be called into action; and it is equally evident that in curves of a circle or ellipse all must alternately be brought into action. The effect then is, that if two only be employed, as in rectilinear figures, those two have an undue share of labor; and by repeating the experiment frequently, as we do in childhood, the notion of tedium is instilled, and we form gradually a distaste for straight lines, and are led to prefer those curves which supply a more general and equable share of work to the muscles.

COLORS CEMENTS—A writer in *Comptes Rendus* states that colored cements which harden rapidly may be made as follows: He takes a solution of silicate of soda (sp. gr. 1.298), and adds to it, while stirring, first pulverized and previously washed, lixiviated chalk, so as to form a thick mass, like butter, to which are added, for coloring purposes, the following substances: Finely pulverized sulphuret of antimony for black, iron filings for gray, zinc dust for whitish gray, carbonate of copper for bright green, oxide of chromium for deep green, cobalt blue for blue, red lead for orange, vermilion for bright red, and carmine for a violet hue. This cement hardens within from six to eight hours, and may afterward be polished, becoming like marble.

The total production of pig iron in the United States in the year 1870 was 1,800,000 tons. In addition to which 200,000 tons were imported, almost exclusively from England—making the total consumption in the country 2,000,000 of tons. The production and consumption of pig iron in the civilized world in 1867 is stated at 9,500,000 tons.

There are 450,000 miles of telegraph wire in Europe, 190,000 in America, 14,000 in India, and 10,000 in Australia. There are, in addition, 30,000 miles of submarine cable, and yet telegraphic extensions throughout the world are going on at the rate of 100,000 miles of wire per annum.

Money is so abundant and cheap in England that a variety of new projects of a more or less speculative nature are showing themselves, though the general produce markets are, as yet, devoid of animation. The rate of discount is said to be below that of the Bank of England (two per cent.), with nothing to be seen in the immediate future to produce a disturbance.

About 850,000 tons of coal are used annually in London to make some 8,000,000,000 cubic feet of gas, and the "little bill" for the same amounts to more than \$8,000,000.

Pittsburg ships 80,000,000 bushels of coal annually.

In 1860 we exported but 1,500,000 gals. of petroleum. In 1868 it had reached 99,000,000, and last year it was 141,000,000. The increase in the flow of oil in Pennsylvania, since 1867, has been nearly 50 per cent.

A set of paper car wheels, on one of the Pullman cars running to Jersey City, have run over 160,000 miles of track, and worn out entirely one set of steel tires, which have been replaced. The ordinary wheels will only run 60,000 miles.

In London workmen are carried on the railroads 120 miles a week for 21 cents.

RAILROAD NOTICE.**The Cincinnati & Great Northern Railroad Company.**

The undersigned Corporators of the Cincinnati & Great Northern Railroad Company hereby give notice that more than ten per centum of the capital stock authorized by the Articles of Association of said Company has been subscribed, to-wit, eight thousand eight hundred and twenty (\$8,820) shares; the said Corporators therefore give notice for the said stockholders to meet at the office of the Railroad Record, No. 167 Walnut street, Cincinnati, Ohio, on Saturday, the 30th day of September, A. D. 1871, at 11 o'clock A. M. of said day, for the purpose of choosing seven directors of said Company. A full attendance is requested.

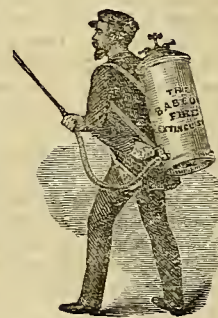
A. J. HODDER,
DURBIN WARD,
T. WRIGHTSON,
S. W. MORTON
ROBT. HEDGER,
Corporators.

CINCINNATI, O., Aug. 30, 1871.

31-8-71, 4.

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Cheapest and Best Protection
AGAINST FIRE.



Puts Out Burning Kerosene,
BENZINE, TAR, ETC.

Insurance Companies Reduce Rates
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The attention of Practical Railroad Men is earnestly invited to the record of work done, and to the fact that nine-tenths of the fires that kindle at stations, in wood piles, and on Trains, are within the power of this Machine when discovered

F. W. FARWELL, Secretary,
122 Washington Street,
CHICAGO.

H. J. BOND, Gen'l Agent,
22 West Fourth Street,
CINCINNATI.

The Railroad Record.

E. D. MANSFIELD, - - - - }
T. WRIGHTSON, - - - - } Editors
A. J. HODDER, - - - - }

CINCINNATI, THURSDAY, SEPTEMBER 7, 1871.

The Railroad Record,

PUBLISHED EVERY THURSDAY MORNING,

By Wrightson & Co.,

OFFICE—No. 167 Walnut Street

SUBSCRIPTIONS—\$3 per annum in advance.

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One square, single insertion.....	\$ 20
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WRIGHTSON & CO., Proprietors

The Advance of Business and Profits in Railroads.

It was recently stated in a public discussion that the freights and business of railroads had declined from twenty to forty per cent. ! We don't know with what year the comparison was intended to be made; but it was replied to that statement that no business in the country had increased more than that of railroads. What is the fact? In 1858, the Commissioner of Statistics made a report on the elements and condition of railroads; and last winter the Commissioner of Railroads returned the same elements for 1870. The period elapsed is twelve years, but the comparison of those periods will enable us to form some idea of the real progress of railroads. As far as possible we shall make that comparison.

Central Ohio.

	In 1858.	In 1870.	Increase
No. passengers	155,122	212,470	30 p. ct.
Tons freight...	153,484	211,305	30 "
Total receipts..	\$405,395	\$835,760	100 "
Net " "	164,697	34,738	decrease

Cleveland, Columbus, Cincinnati & Indianapolis.

No. pass'gers.	306,328	583,694	90 p. ct.
Tons freight..	843,094	831,644	
Total receipts \$1,454,455	\$3,232,109		125 p. ct.
Net "	704,901	1,058,459	50 "
Stock & debt.....		11,499,129	
Net profits.....		9 per cent.	

Lake Shore, Cleveland & Toledo.

No. pass'gers.	711,685	987,500	32 p. ct.
Tons freight..	396,511	1,329,000	230 "
Gross receipts	\$2,181,789	\$6,260,000	200 "
Net	" 1,030,738	2,196,000	110 "

Cincinnati, Hamilton & Dayton.

No. pass'gers.	353,931	735,017	210 p. ct.
Tons freight..	268,819	419,350	60 "
Gross receipts	\$467,944	\$1,195,074	150 "
Net " "	253,560	546,801	115 "

Pittsburg, Ft. Wayne & Chicago.

No. pass'gers.	.....	825,000	
Tons freight..	.....	730,000	
Gross receipts	\$1,546,359	\$3,409,000	110 p. ct.
Net	"	577,787	1,380,000 140 "

We will not pursue these examples any farther. The five roads we have given above are exclusively in Ohio. They present the following aggregate results:

Five Roads.

	In 1858.	In 1870.	Increase
No. pass'gers	1,528,116	2,518,681	65 p. ct.
Tons freight.	1,661,908	2,782,299	70 "

Five Roads.

Gross rec'pts	\$6,055,892	\$14,922,943	161 p. ct.
Net " "	2,730,783	5,215,998	90 "

Number of miles in 5 roads (length)..... 994
Total cost of road and equipments \$58,650,000
Net receipts deducting all expenses \$5,215,998
Net per cent. on actual cost..... 8½ per cent.

The above facts enable us to draw some inferences, which prove exactly what is the condition and progress of railroads, for the above companies are not exceptions to the general rule, but on the whole fair specimens.

1. We see that the business of the roads had in 12 years increased 70 per cent., or about 6 per cent. per annum, from 55 to 60 per cent. in a decade. This is nearly double the rate of increase in the whole population of the country.

2. That the net profit available to the stockholders has increased 90 per cent. in 12 years, or 75 per cent. in a decade, a rate almost treble that of the growth of the whole country.

3. That the net profit is 8½ per cent., which is much higher than can be got for any permanent investment in capital.

The general conclusion from this is that railroads, so far from declining in business or profits, do exactly the contrary; and, what is true of no other property, are constantly increasing both their capital and their profits; for it must be noticed that in this whole period of 12 years these companies were taking a large part of their income to increase their capital. In other words, they have been actually making the roads out of their own income, for some of these roads were not finished when they commenced operation; and they are not finished now, for there is not one with a double track.

4. If the net income of these companies shall (as the above experience proves) increase at the rate of 75 per cent. in 10 years, then the net profits of these five companies will be, in 1880, 15 per cent. upon their capital, and we here predict they will be. For observe, that the increase of gross income is 160 per cent., and supposing that to complete

double track, &c., a portion of this is used (as it has been) to increase capital, still the increase of net profits will go on at the rate given above; and the general result will be that both the business and profits of railroads will go on till the profits accruing from that kind of business will be greater than in any other kind of business in the country. This is the logical conclusion from the facts above.

There are three considerations which prove not only that the present railroads will increase for many years in their business and profits, but also that new roads, when located where they are really needed, must be profitable.

1. The natural growth of the population and business of the country, which is at the rate of 3 per cent. per annum, or 30 per cent. in a decade. Suppose a road has, in 1870, gross receipts \$3,000,000, net receipts \$1,000,000, then in 1880 it will have gross receipts \$3,900,000, net receipts \$1,300,000. Here we observe there is an advance on its net proceeds of \$300,000, which is 8 per cent. interest on \$3,650,000. This will be the result, if it be an average road.

2. It is the effect of a railroad to draw business from all lateral sources to itself, and that effect is constantly going on.

3. A new road (as we have seen in the tables above) is constantly expending a part of its income in finishing the road, but in a few years this ceases, and all the net income goes to the stockholders.

Hence from these considerations we infer, as a logical sequence, that the profits of railroads must be in the future greater than they have been.

Kentucky Letter.

MAYSVILLE, Ky., Sept. 6th, 1871.

I wonder if Cincinnatians know of this pleasant town—so near them, and yet in some respects so far away—as it takes nearly a day to reach it at present. I don't wish to be understood as asking if the name and geographical position of Maysville is known, but its beautiful location, its warm-hearted people, and the richness and beauty of the surrounding country, which, if it had proper railroad facilities, would make it such a desirable place in which to locate.

Situated on a curve of the Ohio, the view up and down the river is one of which no eye could tire, and the opposite bank, dotted with boneses and trees, with rich crops and pleasant groves, from the water's edge to the top of the sunny slope, is indeed lovely; while back of the town rise the Kentucky hills, green and beautiful—some in their natural wildness, some claimed as homes and laid out in lawns and gardens, but all crowned with trees.

The town itself is a quaint old place, but is gradually being modernized, and the newer houses show great improvement in architec-

ture, while the residences on the hills are sometimes very charming.

The drives are magnificent, each turn bringing you to some new beauty in the landscape, and enticing you on and on, till the passing of the hours commands your unwilling return.

The great need for a railroad bids fair to be answered by the construction of the Kentucky & Great Eastern through this town, which will place Maysville within two hours of Cincinnati, and on the direct route to New York. Col. Morton and Mr. Hodder (president and vice president of that enterprise) are here now, and have laid before the people such fair and desirable terms that it seems impossible that they should not be cordially accepted.

The people are alive to their interests, and see the importance of being on this grand new line to New York; the ladies especially, are full of enthusiasm, and did the vote depend upon *their* suffrages, there could be no doubt of its being given on the side of progress, and judging from their energetic support of the scheme and the determination to have it which we see mirrored in their bright eyes, we are much mistaken if they fail to enthuse the few old fogies who are trying to oppose the barrier of their ignorance and prejudice to the flood of progress and prosperity now seeking a channel through Mason county to the East.

Come it must. The only question is, will Maysville accept the terms of the company, and lift herself ten years forward at one spring, or will she let this golden opportunity pass, and settle down into a pretty little river town, too inaccessible to command either the population or the capital her favorable location would attract.

The only railroad here is one under process of construction from here to Lexington, which is nearly completed for twenty miles. It has no passenger cars at present, but a ride over the road in a baggage car showed us still greater causes for admiring this beautiful region of country. Before, behind, on either side, the ground rises in graceful undulations, with here and there a cosy looking farm house, while the fields were some covered with later crops, some relieved from their grains already garnered, and some beautiful with groves and pasture.

Everywhere was that diversity and beauty of landscape which have charmed our eyes since we landed in Maysville, and we only seemed to lack vision to take it all in, as we bounced along.

The railroad is so new and insufficiently ballasted that our ride was a very lively one, and one which for the cautioning of people with delicate nerves should be labeled "When taken to be well shaken," like a mixture; but the beauty of the route will cause any one to forget all its little discomforts, or repay him for them a thousand fold.

It is no cause for wonder that any one should be delighted with this section of Ken-

tucky, but it is astonishing that any people, so highly favored by nature, and so intelligent as these, should be content to wait twenty-four hours for their daily papers, or to consume two days in going to and returning from Cincinnati, when they could be in condition to command the notice of their own and neighboring States, and have all the advantages that result from a large organized community like Cincinnati within their reach.

If they do neglect this fine opportunity, we shall think their leading men are under the ban of some fearful spell, and shall advise all travelers to beware of this port till some powerful spirit of light is found to exorcise this genii of darkness.

ALIANDA.

The Vibratory Rail.

Mr. Beers, of Brooklyn, N. Y., the inventor of the Vibratory Rail, in a letter to us, says:

"The combination of principles embraced in the Vibratory rail is the result of long experience, research and experiment, extending over more than forty years of professional life, including a tour of observation through the principal railroad countries of Europe.

"Notwithstanding the universal adoption and perfect satisfaction with the T rail, the time will come when its use would be regarded as quite as absurd as the use of a cable formed of parallel fibers, each occupying a right line from end to end, instead of the reverse, and compound curves formed by a series of twisted strands. A moderate strain would begin to part the separate fibers one by one, in the first case, while in the latter nothing would be broken until the combined strength of the whole mass was overcome.

"The Vibratory rail embraces principles not readily nor indeed appreciable without careful and attentive study of the subject. To aid those who may desire to understand or appreciate the principles involved, I enclose a brief analysis, published in the *Railroad Gazette* of the 12th inst.

"Notwithstanding an economy of twenty per cent. in iron, and twenty-five in steel, on first cost, the rail will be more durable, and the economy on the wear of equipment will be quite as important.

"The oblique form of the shank will strike every one unacquainted with the subject as an indication or source of weakness, whereas it is really the initial source of the great increase of strength, by necessarily enlisting and originating elements of resistance which involve the combined strength of the whole rail in every direction, while if the shank was strictly vertical nearly one-half of the available strength would remain undeveloped, as in the T rail."

— The Lake Tahoe and Central Pacific Railroad tunnel will be five miles long, through solid granite, nineteen feet in height, and twenty-one feet wide.

Beers' Vibratory Rail.

This rail is the invention of Mr. S. A. Beers, of Brooklyn, and is intended as a substitute for the ordinary T rail. It has been in use on the Hudson River Railroad for three years, and it is claimed by the inventor that it has important advantages, which we present in his own language:

"To facilitate an explanation of this difference, the principle represented by the T rail will be first considered:

"Any bar of iron, or any form of railroad rail, contains *three* distinct elements of strength: First, vertical, or perpendicular strength; second, lateral, or transverse strength; and third, torsion, or twisting strength. In reference to the T rail, it should be understood that but *one* of these elements, that is the verticle, is or can be used; the other two, which constitute about one-half of its ultimate strength, are undeveloped; and the metal out of which these forces are created, when placed in proper form and position, is here present only as dead weight and neutral axis; and being presented in the shape of an anvil, transversely, every blow from the wheel produces the greatest possible amount of abrasion.

"As the *direction* of the load or force can not be changed from the verticle, the *form* of this rail is changed to an oblique resistance by making the top of the head and shank overhang the bottom of the shank or fulcrum, so that under extreme pressure the head and upper portion of the shank shall be deflected laterally, while the whole rail or section may or may not be subject to vertical deflection.

"By this change of form, the neutral axis of the T rail is placed under strain by transferring the fulcrum or initial point from the center, as in the T rail, to near the bottom of the shanks.

"This oblique shank then presents an overhanging spring, upon which a pressure or weight of say two tons would produce a lateral deflection of the head and a longitudinal fracture along the side and near the base of the shank; provided the section of rail was not more than four inches in length; but were it three feet in length, it would of course require nine times the weight, or eighteen tons, to produce the same effect.

"And if the rail was eight or ten feet in length, then would be developed the third element, torsion strength.

"As the head of the rail must be twisted edgewize out of alignment, at the point of contact, and for some distance each way along the rail, before any strain can reach the shank, hence it follows that any amount of strain to which the rail is subject in use is thrown upon and carried by the strength of the rail head laterally, or edgewize, and not on the shank, however thin.

"And as the tendency to deflect is inward, such tendency is met and neutralized by the lateral force generated and intensified by oscillation of the engine in proportion to the speed.

"This spreading force, which is superior to the vertical weight of the engine (when running at high speed), is met and resisted, not by the tenacity of the inside spikes, as in the T rail, but by the oblique shank forming a brace in the direction of this thrust, or last named force.

"As a result of this combination of principles, heretofore unused, the rail becomes a compound, lateral spring of superior strength, based upon the principle of reverse and compensating curves, within which combination

there remains neither neutral axis or dead weight.

"Oscillation, on the T rail, increases with the speed, and soon fixes a limit beyond which it is unsafe to run, while the effect of speed upon this spring power is reversed. As the successive blows and changing pressure from oscillation of the train are intensified by increasing speed, and thus additional service is thrown upon the rail, the spring power will be more fully developed and held under constant or continuous tension. Hence the greater the speed the steadier will be the motion of the train, so that speed will no longer be limited, as at present, by the imperfection of the track, but be dependent upon the perfection of journals and wheels.

"By this change of form and utilization of the dead weight and neutral axis of the T rail, the capacity of the vibratory rail is increased fully 30 per cent. in iron and 40 per cent. in steel; so that after reducing the weight and cost 20 per cent. in iron, and 25 in steel, we maintain an important increase of strength over the T rail of full weight, thus leaving a 50 pound rail in iron or steel amply sufficient for the heaviest class of road, and 40 pounds sufficient for any medium class, or 30 pounds for any class of narrow gauge.

"The fish plate fastening, as applied to this rail, instead of spreading or breaking under extreme depression at the joint, presents a section of a cylinder; so that under the above pressure it presents no breaking point, like the thin lower edge of the vertical plate of the T rail, but will spring inward instead of outward, and thus place the entire surface of the wide base of the plate and the whole of the inner surface below the bolt under tensile strains: Hence liability to breakage is effectually prevented.

The outside plate is simply a continuous washer.

This fastening has but three bolts, the center bolt acting directly upon the joint.

"The length of the plates is eighteen inches, and the weight from seven to ten pounds."

A NATIONAL SYSTEM FOR TIME ON RAILROADS.—The confusion experienced by the traveling public in respect to time is so great that any thing like a practical system in this direction must be received with favor. Mr. C. F. Dowd, of Saratoga, N. Y., has devised such a system, which he calls "a national system of time for railroads." It is based upon national longitude. It adopts Washington time for the eastern portion of the country as standard time; one hour slower than Washington time for the Mississippi Valley; two hours slower for the Rocky Mountain section, and three hours slower for the Pacific States. These standards are designated by the small figures 0, 1, 2, 3, respectively placed in a little elevated position before the names of the stations. Then, to designate the minute difference between the local time of any station and railroad time or standard time, small figures are placed in a little elevated position after the names of the stations. These figures, when they indicate that railroad time is too fast, have a sign, †, before them, and the sign, —, when they indicate railroad time too slow. The whole system is very simple, and if adopted would very soon be understood by the traveling public. If adopted, the traveler could keep his own time wherever he might go, and take the cars by his own watch as well in one part of the country as in another.

Little Miami Railroad.

NEW RATES TO COMMUTERS.

The following schedule of rates to commuters took effect on Sept. 1:

Between Cincinnati and	Monthly 54 trip Tickets.	School 4½ trip Tickets.	Single rate Ticket on Acc. Trains.
Pendleton	\$2 45	\$1 65	\$0 10
Tusculum	2 45	1 65	15
Columbia	2 45	1 65	15
Linwood	3 00	2 00	20
Red Bank	3 40	2 25	25
Plainville	3 95	2 65	30
Newtown	4 05	2 70	30
Gravelotte	4 70	3 15	40
Milford	4 90	3 25	40
Camp Dennison	5 05	3 35	50
Mamsville	5 25	3 50	50
Branth Hill	5 65	3 75	65
Loveland	6 00	4 00	70
Butterworth's	6 40	4 25	75
Foster's	6 75	4 50	80
South Lebanon	7 50	4 85	95
Morrow	7 50	5 00	1 10

Monthly and school tickets are good only on accommodation trains, and for the month for which they are issued. They will be on sale at the ticket office of the Little Miami depot, Cincinnati, on the last five and first five days of each month.

Family commutation tickets, which include all members of family and employees, will be sold between any two stations, good on any train which stops regularly at such stations, at the following rates: 26 trips, at 2½ cents per mile; 50 trips, at 2¼ cents per mile.

Chesapeake & Ohio Railroad.

A letter from the White Sulphur Springs, in the Washington *Patriot*, says:

The Chesapeake & Ohio Railroad is now under contract from this point to the Ohio river, to be completed in July, 1872. Its terminus on the Ohio is at or near the mouth of the Big Sandy river, where the town of Huntington has been laid out on an extensive scale, and important improvements already made. A wealthy company have the matter in hand, and have built hotels, workshops, dwellings, wharves, &c., in readiness for the fast growing business of the road. The town is named after C. P. Huntington, Esq., of New York, the president of the railroad company. Gen. Wickham, of Richmond, is the vice president and the active manager of the company.

From Huntington to the falls of the Kanawha river, a distance of over a hundred miles, the road will be finished and the cars running on it by the 1st of October. The connection will be made from that point to this by a line of stages, over a macadamized road. The distance is about eighty miles. The whole length of the line is under work, pushing rapidly forward. From this place to Millboro they are making a new road, so as to supersede the heavy grades of that portion of it. When completed, in July of next year, there will be no grade on the road greater than 29 feet to the mile—an unexampled achievement in scaling the Alleghenies, and an advantage over other projected routes.

It is impossible to conceive the immeasurable advantages to arise from this great enterprise to Virginia and West Virginia. Washington being now one of the centers of a great railway network, will receive her proportion of the benefits.

The Deer Creek Tunnel.

We have learned lately that the decision of the Superior Court is that this neglected work is to be speedily resumed, and completed, and the railroad system within the city put upon its natural legs. If there ever was a circumlocution office in the world, it is to be found in the enormous losses every twenty-four hours, of miles upon miles, to the several roads, and days and weeks of time to passengers, in consequence of the cars being compelled to make the circuit of the city. The Marietta road for example runs twenty odd miles to reach the city from Montgomery, distant not over twelve miles from the center of business. The route is worse than a horse-shoe track, and if the thing can be helped, it ought not to be tolerated for another day.

It seems, that the capital and the parties are ready to proceed without delay. General Fremont and his associates, both engineers and capitalists, are here backing up Mr. Hodder, who is the president of the new company and reputed to be one of the best posted railroad men among us. It remains for him to verify the good opinion of his friends by an energetic building of the tunnel, a work with which it ought to gratify any man's ambition to be connected, because of all such works it will probably be the most lasting, if not imperishable. It is a burning shame that this absolute necessity for the city—as much, and indeed more so than the suspension bridge, had not been finished long years ago. We think it must have been fifteen years since it was abandoned, one-third done. It has stood all that time, like a rock of accusation against the enterprise of Cincinnati—the only city of the North or West that would have allowed it.

The completion of the tunnel, and for that matter its prosecution, will make up the Deer creek improvement at both ends and in the middle. There must be some way, without usurpation of city powers or sacrificing individuals, by which that Golgotha can be redeemed from its present miserable condition. So many important reasons concur in its being brought out of the pit in which it is now sunk, that we look forward to its early redemption so as to afford a proper grade for railroad tracks by the score; not only into Cincinnati from the East and North, but from the South, with room for all manner of accommodation for the most extensive railroad business, and for all the shops, factories and warehouses incidental to it.

The city can order almost what grade it pleases, and private owners of property will have to conform. The railroads as well as the tunnel company will take hold in earnest, and very soon the whole scheme of Deer creek improvement will begin to take shape. The day of deliverance from that sphynx can not dawn too soon.—*Commoner*.

GALVANIZED IRON.—A method of estimating the quantity of zinc existing in the plating of galvanized iron, has been communicated to the *Philosophical Magazine* by Mr. T. Warren. The principle of this method consists in the use of mercury to dissolve the zinc, when the loss of weight can be easily ascertained. But a thin coating of an amalgam of iron and zinc will remain, which will take up a certain quantity of mercury, and the amount of this amalgam present is measurable by the quantity of mercury it will take up. To determine this quantity of mercury, the iron is weighed, then heated to drive the mercury off, and then weighed again, when the weight of mercury which has mixed with the amalgam will be at once ascertained.

Indianapolis, Cincinnati and Lafayette Railroad.

Compromise in the Legal Difficulties—Terms of the Agreement already Signed by the Majority of the Heaviest Creditors—The Bankruptcy Suit to be Withdrawn.

This agreement, made by and between the parties whose names are hereunto signed, being the holders of the bonds of the Indianapolis, Cincinnati & Lafayette Railroad Company, which are secured by a mortgage of the property, rights and franchises of said Company, as well as those of the Cincinnati & Indiana Railroad Company, to Benjamin E. Smith and George Hoadly, Trustees, and which are known as the bonds of 1869, and creditors and stockholders of the Indianapolis, Cincinnati & Lafayette Railroad Company, and of the Cincinnati & Indiana Railroad Company, to the extent set opposite their respective names, as hereunto signed, parties of the first part, *inter sese*, and Thomas H. Perkins, William A. Booth, Preserved Smith, Joseph Kinsey, and A. S. Winslow, parties of the second part, witnesseth: That whereas claims exist against the Indianapolis, Cincinnati & Lafayette Railroad Company, and Cincinnati & Indiana Railroad Company, in the manner following, to wit:

By the holders of bonds of various issues prior to the mortgage of 1869	\$6,400,000
By the holders of bonds of 1869...	2,000,000
Interest overdue and unpaid about	350,000
Floating debt, about	1,500,000
Contingent liability upon Cincinnati & Martinsville Railroad Company's stocks and bonds.....	800,000
Contingent liability upon the Little Miami Railroad Company's and the Indianapolis, Cincinnati & Lafayette Railroad Company's street connection bonds.....	525,000
Ditto, upon the Whitewater Valley Railroad Company's bonds.....	1,000,000
To the holders of the Cincinnati & Indiana Railroad Company's stock, guaranteed by the Indianapolis, Cincinnati & Lafayette Railroad Company, about	45,000
By the stockholders of the Indianapolis, Cincinnati & Lafayette Railroad Company, about.....	5,700,000

And whereas, the debt of the company is greater than there is any fair prospect of said companies being able to pay, a large portion of which is now due, and it is proposed that the property and franchises of the said companies shall be sold under foreclosure of the mortgage of 1869 or in some other manner such as the Trustees hereinafter named may deem for the best interest of the parties hereto; that the unpaid interest and debt be funded; the companies reorganized as one company; and that the said bondholders, creditors and stockholders shall have such interest in the said reorganized company as the amounts and position of their respective claims fairly entitle them to, as hereinafter specified and agreed, it being understood that the six million four hundred thousand dollars of liens prior to the mortgage of 1869 are not to be disturbed by said organization. Now, therefore, for the purpose of carrying the said plan into effect, it has been mutually agreed as follows: The bondholders of the mortgage of 1869, subscribers hereto, the creditors and stockholders of said companies, also subscri-

hers hereto, hereby irrevocably constitute and appoint Thos. H. Perkins, William A. Booth, Preserved Smith, Joseph Kinsey and A. S. Winslow, their agents, attorneys and trustees; that they, or a majority of them, shall represent them and their claims in said roads, in any legal proceedings in the settlement and reorganization of said companies, in such manner as to the judgment of said trustees may seem best.

And the subscribers hereto hereby request and require said trustees to procure or consent to a sale of the road, as aforesaid, and to attend said sale, and at such price as they, or a majority of them, or the survivor of them, may determine, to purchase the whole of the property covered by and to be sold, and hold the same for the trusts and purposes set forth in this agreement; and to enable the said agents and attorneys to make payment for the said purchase, but for no other purpose, we, the subscribers, holders of bonds of 1869 and debts, do hereby individually and irrevocably invest them, and the survivor or survivors of them, with the entire interest we have in the said existing company or companies, under the mortgage of 1869, or as holders of debts or claims of any nature whatever as affixed to our names; and we respectively agree, the one with the other, and with the said agents and attorneys, that we will, whenever thereto requested by said trustees, immediately place in their hands such evidences of the company's indebtedness to us, and to the extent set opposite to our signature hereto, as we may hold, and as may be necessary to enable them to make payment therewith for the said purchase.

It is agreed by the said agents and attorneys that if they are enabled with the amount of evidences of indebtedness with which they are hereby invested, and which are by virtue hereof to be placed in their hands, to purchase the property and franchises covered by and to be sold as aforesaid, they, or the survivor or survivors of them, will make the purchase as aforesaid at the said sale. The amount which shall be bid for the said property by the said trustees shall, however, be left entirely to their discretion, and the said trustees shall not be bound, in any way, to purchase the same, unless they can do so upon such terms and for such amount as they deem advisable; but in case the said trustees shall determine not to make such purchase under this article, they shall notify the parties of the first part of such determination at least thirty days before any foreclosure, bankruptcy, or other sale of the said road, and of the property aforesaid, and shall forthwith transfer and surrender to the parties of the first part all securities, all evidences of indebtedness which may have been placed in their hands, and the agreement shall thereupon cease and be at an end; and the said parties of the second part agree that in case the parties of the first part shall enable them to purchase said road, either with the securities and debts so to be deposited, or by payments to them in money, then that they will buy the said road on any mortgage or sale thereof; and, in case they are unable to buy the same, that they will bid on such sale to the full extent that the securities, indebtedness or money of the parties of the first part will authorize and warrant; and that said parties of the second part will not become the purchasers, or be interested in any purchase of said roads, except for the benefit of the parties of the first part and under the provisions of this agreement; and any such purchase shall enure to the benefit of the parties hereto of the first part.

And it is respectively agreed between the subscribers hereto, the one with the other, and between all of them and the said agents and attorneys, that, when the said purchase of the property and franchises shall be made under sale, subject to prior incumbrances, or otherwise, the said agents and attorneys shall and will hold the same on the trusts and for the purposes following, namely:

First—That the said agents and attorneys are, as soon as practicable after the purchase of said property and franchises, to reorganize the said company, under laws of the States of Ohio and Indiana; and that the said property and franchises shall be vested in the company reorganized.

Second—That the entire indebtedness due to the holders of bonds of 1869 shall be paid and liquidated by issuing new bonds, secured by a mortgage bearing the same date as the reorganization, principal payable in thirty years, with seven per cent. interest, payable semi-annually, represented by coupons attached; and the first coupon maturing after such reorganization upon each of such new bonds shall be cut off, and, with all interest upon mortgage bonds due and unpaid at the date of said reorganization, shall be funded, so far as practicable, by said trustees, by payment in bonds having ten years to run, bearing interest at seven per cent. per annum, payable semi-annually, secured by sinking fund of at least fifteen thousand dollars per annum, and by a mortgage duly executed and recorded, and which shall be a prior lien to the proposed consolidated mortgage bonds.

The mortgage to be created to secure the bonds to be issued in exchange for the bonds secured by the mortgage of 1869 shall be a consolidated mortgage over the whole property to an amount sufficient to cover not only the principal of the bonds of 1869, but also the principal of all bonds of the company embraced in the prior liens, amounting to \$6,400,000; and after a sufficient amount of bonds, secured by said mortgage, has been issued in exchange for the bonds of 1869, the residue shall be issued by the Board of Directors of the reorganized company, only as required either to be sold to redeem any bonds maturing secured by prior liens, or to be exchanged for any such bonds as may by them be determined; and the same, to the extent of \$6,400,000 and their proceeds shall be used for no other purpose whatsoever. The said consolidated mortgage shall provide for the accumulation from and after the 1st day of January, 1867, of a sinking fund of one per centum per annum, on the amount of bonds that may be outstanding on and after said 1st day of January, 1867.

Third—That the entire floating debt against said company shall be liquidated and satisfied by the issue of income bonds of the company so reorganized; these debts to be made up to the date of one year after reorganization, with interest at seven per cent., at the rate of one income bond (par value one hundred dollars) for every one hundred dollars of debt and interest so made up, and it is understood and agreed that the total issue of said bonds, under this agreement, shall not exceed one and one-half million (\$1,500,000) dollars; and after payment of the interest upon the prior bonds upon said road, and after the proper payments to the Sinking Fund, said bonds shall be entitled to receive in interest all the net earnings of the company, as reorganized, until the same shall amount to seven per cent. in any one year. All excess over seven per cent. in any one year shall be first applied to discharge the unpaid interest upon said in-

come bonds due in any prior year, together with interest at the rate of seven per cent. per annum on said unpaid interest, and after payment of all such interest in arrears, and the interest thereupon as aforesaid, then such excess shall be applied to the purchase and cancellation of said income bonds as long as the same can be purchased less than eighty per cent. of their par value. But when, and as soon as said income bonds shall reach the price of eighty per cent, as aforesaid, then and thereafter said excess shall be applied first to the discharge of all interest in arrears as aforesaid, with the interest thereon; secondly, to a sinking fund of not less than twenty thousand dollars per annum, to be applied to the purchase and cancellation of said income bonds, and thirdly, to dividends upon the stock. Said income shall be payable twenty years after date, and secured by mortgage of all the property and franchises of the reorganized company, and the same shall be the next lien after that of the proposed consolidated mortgage bonds. Thomas H. Perkins and Henry A. V. Post shall be the Trustees of said mortgage for the security of said income bonds, or if either of them decline the trust, then the vacancy shall be filled by said Perkins and Post.

Fourth.—Said trustees may settle with the holders of Cincinnati & Indiana Railroad Company's guaranteed stock with said bonds at par.

Fifth.—That the holders of stock in the Indianapolis, Cincinnati & Lafayette Railroad Company shall receive in exchange, one share of new common stock in the reorganized company, of a par value of one hundred dollars for every two shares of present stock.

Sixth.—That said trustees may settle all contingent claims of said company as they, or a majority of them, may deem for the best interest of the parties hereto. It is agreed between the subscribers hereto that all cases of fractional amounts shall be adjusted by the issue of scrip, convertible into mortgage bonds, income bonds, or stock, as the case may be. It is also agreed that said agents and attorneys may use an amount of said income bonds not exceeding one hundred and fifty thousand (\$150,000) dollars, to settle with such creditors as may have security for their debts, to pay for their own services and for such services, legal or otherwise, as they may require in carrying out this plan. It is also agreed that if the said trustees require any money to carry out this agreement, they may sell such an amount of income bonds as may not be used, at such price as they deem proper. It is further agreed that this agreement shall take effect as to those signing the same, provided the same is signed by two-thirds in interest of the bondholders of 1869, and by two-thirds in interest of the unsecured creditors. It is further agreed that said agents, attorneys and trustees shall be liable for nothing save faithful and impartial discharge of their duties under this agreement; that neither shall be liable for the default, neglect or malfeasance of the others. It is further agreed by the subscribers hereto, that they will each, when thereto requested by the said trustees, execute and deliver any agreements or papers that may be necessary to enable said trustees to carry out this agreement according to the true intent and meaning of the same. It is further agreed that the undersigned parties of the first part shall not be liable for any charges, expenses, costs or damages, for any acts of said attorneys, agents or trustees, it being understood that no authority to incur any personal liability is delegated by this agreement.

It is further agreed that in case of the death, resignation, or inability of either of said trustees to act, the survivors or survivor of said trustees may appoint some suitable person or persons to fill said vacancy.

Each certificate of stock of the reorganized company, before the issuing thereof, shall have indorsed upon it, and signed by the party to whom it is issued, an agreement to give the proxy of the holder and owner of such certificate, irrevocable for the term of five years from the date of reorganization, authorizing Henry A. V. Post and A. S. Winslow to cast the vote of the said holder and owner upon said stock for three members of the Board of Directors, the said holder and owner reserving the right to vote for the other six members of the said Board, in person or by other proxy as he may choose; and such proxy shall be simultaneously executed and delivered to said Post and Winslow, and said proxy shall continue for the said period without regard to the transfer of said stock; but each successive holder of the same shall be bound by this agreement, and all stock certificates shall contain a reference to this agreement, and each successive holder thereof shall give his proxy as above to said Post and Winslow, or the survivors of them, or to such person as may be designated by a majority of the holders of such proposed income bonds, to act as such proxy in case of the death or inability to act of Post and Winslow.

It is understood and agreed that there are to be three copies of this agreement for signature, all of which, when executed, shall constitute but one and the same agreement.

In witness whereof, we, the agents, attorneys and trustees, the bondholders, creditors and stockholders within named, have hereunto interchangeably set our respective names, the day and year first above written; and have also stated, opposite our names, the nature and amount of our interest in the said company or companies, and the places of our respective residences; and the said parties of the second part have also hereunto set their hands the day and year first above written.

THE HAMILTON & LOVELAND RAILROAD.—The Hamilton & Loveland Railroad Company, which has been incorporated some months, will employ Phineas Pomeroy, formerly of Middletown, to survey their proposed route, as soon as he completes the survey of the Cincinnati, Twin Valley & Greenville Railroad, upon which he is now engaged. The Hamilton & Loveland Railroad is intended to accomplish two very important objects. One is to give a second and competing road to Cincinnati, and the other is to furnish a link to the Baltimore & Ohio route to the West and North-west. It will intersect the Short Line, now building, at a point in the neighborhood of Sharon or West Chester, and thus enable the people of Hamilton to run trains to Cincinnati over that road, making the distance but little greater, if any, than by the Cincinnati, Hamilton & Dayton Railroad. The connection at Loveland with the Baltimore & Ohio makes a direct line from Baltimore and the seaboard to St. Louis, Chicago and the great West. It is a much shorter line west than via Cincinnati, and saves reshipment, time and expense. The new road will run in a pretty direct line from Hamilton to Loveland, passing through a rich, fertile and thickly settled country.—*Lebanon, O., Patriot.*

—The first horse railway in this country was the Harlem, established in 1832, but the general inauguration of the American system only dates back to 1853.

Denver & Rio Grande Railroad.

The published description of the country through which this important narrow gauge road will pass states that the elevation of Denver City above tide is 5,200 feet, that of Santa Fe 7,100 feet, that of Chihuahua, 4,368 feet, and that of the City of Mexico, 7,990 feet. It is a mountain land of pine forests, broken by inclosed plains called parks, and extensive valleys of great beauty and fertility. Coal beds crop along the eastern foot of the mountain range. The mountains themselves are rich in iron, gold, silver, lead, copper, zinc, limestone, granite, and clays. The road is intended to run from Denver City southward, along the outcrop of the coal, 100 miles past Colorado City; then enter and ascend the valley of the Arkansas river, southward, to Canon City, and westward 40 miles, to Poncho Pass. Here it resumes its southerly course; crosses the mountain divide, and gets upon the extreme head waters of the Rio Grande in Homan's Park. This part of the line is 30 miles long. The rest of its way the road follows the Rio Grande south, for 140 miles, crossing four considerable rivers, which enter the great river from the east; the last two of these branches being the Callora and the Aroyo Honda. The course of the road now becomes S. 30 deg. W., and still along the east bank of the great river; past San Juan, 60 miles, where it has Santa Fe to the east of it, distant 15 miles, Santa Felipe, Bernalillo, Atrisco, and Pajarito, where it crosses to the west bank of the river. This point is 250 miles south of the Arkansas river. Here the line crosses at right angles the proposed line of the Atlantic & Pacific Railroad, (coming up the Canadian Fork, and the head-waters of the Rio Pecos, by Fort Butler, and Anton Chico, through the Canon Blanco, by Alhuerque.) The railway will be completed and in running order from Denver City to Colorado City, 80 miles, this month, securing the trade of the Platte Canon, and of the mines and forests of the South Park. This secures also the Lake Pass, the only practicable crossing of the divide between the Platte and Arkansas rivers. Grading has been commenced in the Arkansas Canon, 50 miles from Colorado City, the most important entrance into the park country, and into the southern and western mining districts of Colorado. The passenger and freight traffic of the Rio Grande will be at once diverted to this new route.

There is a growing impression that Congress will discriminate against those banks which refuse to convert their 5-20 bonds, in order to extend the funding operations of the government beyond \$200,000,000. There is already some talk of making 5, 4½ and 4 per cent. bonds the sole basis of banking.

Banking in England is an exceedingly profitable business. Taking the twenty-five banks in London, and their branches in the country, the gross profit is £1,197,744; expenses, £118,815; net profit, £778,929; so that only about 34 per cent. of the gross earnings is expended in the cost of the business, whilst in other countries it is 48 per cent.

The number of foreigners a short time ago computed to be in London was nearly 300,000. Of these, 80,000 were Germans, 150,000 French, 50,000 belonged to the other continental countries, and 10,000 were Americans.

Journal of Railroad Law.

RAILROAD COMPANIES—NEGLIGENCE OF PERSONS INJURED NOT ALWAYS A BAR TO RECOVERY—RULE OF LAW AS TO CONTRIBUTIVE NEGLIGENCE.

The facts in the recent case of the Chicago, Burlington & Quincy Railroad Company *vs.* Thomas Payne, administrator, etc., (49 Ill. 499), are fully and clearly stated in the following opinion by

WALKER, J.—This was an action brought by appellee, as administrator of Albert Y. Payne, to recover compensation, under the act of 1853, for the alleged killing of Payne by the negligence of the employees of appellants. It appears from the evidence that the deceased was driving in a covered buggy upon the highway, and at a place where the road intersected with the railway of appellants, and came in contact with a passing train, and was instantly killed.

It is averred in the various counts of the declaration, that the railway company kept no warning board at the crossing, that no bell was rung or whistle sounded to give notice of the approach of the train, as required by law, and the engineer in charge of the train was drunk at the time the accident occurred. The company denied negligence on their part, and allege that there was a want of ordinary care on the part of the deceased as he approached the railroad.

On the trial in the Court below, there was a large amount of evidence produced by each party, but inasmuch as the case will have to be submitted to another jury, we deem it improper to discuss its weight or whether it supported the verdict. From a careful examination of the instructions given the jury, we are satisfied they do not announce the law to the jury so clearly and distinctly that we can see that they were not misled in arriving at their verdict. They seem to conflict, and to leave the jury a choice as to which class they should adopt. A party has the right to have the law applicable to his case fairly, clearly and distinctly stated in the instructions given to the jury. It is not sufficient to say the law in the case is correctly announced in a part of the instructions, if it is incorrectly stated in others.

This is the second of the plaintiff's instructions which the Court gave to the jury.

"If the jury believe, from the evidence, that the defendant was guilty of gross negligence, under all the facts before them, in running its train to and over the common highway crossing, and thereby the death of Albert Y. Payne was caused, then, even though the deceased did approach such crossing with some and a less degree of negligence, while traveling on the highway, such negligence of the deceased would not destroy the plaintiff's right to recover in this action."

The third instruction given for appellees is this:

"Even if the jury believe, from the evidence, that the deceased, Payne, did with some negligence, on a highway, approach the railroad crossing of the same, yet, if the defendant recklessly and with gross negligence, approached with its train to and crossed said highway, and thereby caused the death of the said Payne, as charged in the declaration, such negligence of the deceased would not justify such gross negligence of the defendant."

Appellee's fifth instruction is this:

"It was the duty of the defendant to operate its train in coming to and crossing said

highway with due care and precaution to avoid injury to persons passing on said highway, and if by sounding the whistle of the locomotive or ringing the bell thereof, in such manner as could have been reasonably done under the circumstances, injury to the deceased would have been prevented, and by wrongful failure so to do, the death of said Payne, resulted as alleged in plaintiff's declaration, then the jury should find the defendant guilty."

Appellee's sixth instruction is this:

"If the defendant had erected and maintained a post on its track, some 80 rods east from said highway crossing, at and from which its trains in approaching said crossing were accustomed, by whistle or ringing of a bell, to give notice of its approach to such crossing, and such whistle or ringing of bell would reasonably have prevented the accident in evidence, and on the occasion in evidence the defendant failed to ring a bell or sound a whistle, and that thereby, and the negligence of the defendant, the death of the deceased, Payne, was caused, as alleged in the declaration, then the jury should find defendant guilty."

It is the established doctrine of this Court that, although a plaintiff may be guilty of negligence, still the defendant will be held liable if his negligence is greater than that of the plaintiff. Where the negligence producing the injury is equal or nearly so, or that of plaintiff is greater, then he can not recover. Although he may be guilty of negligence, yet if that of the defendant is greater, amounting to gross negligence, he would be liable. Negligence resulting in injury is comparative and it is not required that the plaintiff shall be free from all negligence, or that he shall exercise the highest possible degree of prudence and caution, to entitle him to recover, if the defendant is shown to be guilty of a higher degree of negligence.

In the case of the Galena & Chicago Union R. R. Co. *vs.* Dill, 22 Ill., 264, it was said that where the company have erected the proper signs and notices at the point of intersection, the highway traveler should, under ordinary circumstances, heed its warning, and use proper precaution to avoid a collision, and failing to do so, negligence more gross on the part of the company only will render them liable for injuries received. It was also held, in that case, that each party had the right to use their respective roads, but in doing so they were required to use all reasonable precaution to prevent injury to the other. That the traveler on the highway had the same but no greater right, to travel the highway over the track of the company than the latter had to pass over the highway, and that both should exercise prudence in the enjoyment of their several rights. But that the road was not required by statute to ring a bell or sound a whistle.

If an individual in crossing a railroad track, is guilty of negligence, that does not authorize the employees to wantonly kill such individual. His negligence may be a wrong to the company, but he does not thereby forfeit his life. If his negligence produces injury to the company, the Courts are open to them for redress. And it would be monstrous to hold that because a person is careless in regard to his safety, he thereby renders himself liable to destruction with impunity, by persons operating railroad trains. Such a doctrine can never be sanctioned in a court of justice. In such a case, the employees of the road should use every reasonable effort to prevent the destruction of the individual, al-

though he is negligent. But at the same time, if the deceased so acted that it was not within the power of the engine-driver to prevent the collision by the employment of reasonable diligence and effort, then the company are not liable.

It will be observed that the instructions given for the plaintiff, and which we have quoted, do not recognize the rule here announced; and although they would probably not mislead members of the profession, still, to men not versed in the rules of law, they were calculated to, and may have misled the jury in this case.

It will be observed that these instructions do not state the rules of comparative negligence. The second only announces a rule that a less degree of negligence on the part of the deceased would leave the company liable. This instruction does not define the degrees of negligence with accuracy. If the deceased was guilty of negligence, then the negligence of the company should have been so much greater as to clearly preponderate, as was said in the case of Chicago, Burlington & Quincy R. R. Co. *vs.* Dewey, supra. But, taken alone and disconnected from the other instructions given for appellants, this instruction might not have been so far objectionable as to require a reversal.

The third is, however, more objectionable. It informs the jury that if deceased was guilty of some negligence, yet if appellants recklessly and with gross negligence crossed the highway and caused the injury, the company would be liable. The expression "some negligence" is indefinite, and embraces every degree of negligence except the highest and most gross. Even if deceased had been guilty of negligence approaching the most gross, the jury would have been warranted in finding for appellee, and that, too, although greater than the negligence of the employees of the company. Even though they are guilty of recklessness and gross negligence, the company would not be liable. And this instruction is liable to that construction.

The fifth instruction correctly defines the duty of the road, but entirely ignores the duty of the deceased. And as the defense was based on the theory of negligence of deceased, to the degree that would exonerate the company, this instruction should have been modified so as to announce the proper rule as to comparative negligence.

The sixth instruction fails to announce the rule as to comparative negligence.

Although the fourth instruction asked by appellants was incorrect and should not have been given, still it was not accurate as modified by the Court before it was given. As modified it ignored relative negligence of the parties, and failed to announce the proper rule and may have contributed to mislead the jury. While the instructions given for appellants laid down a different rule from that announced on appellee's instructions, still the jury were, by all the instructions before them, left to select and act upon either rule as it might strike them as being most proper. In this the instructions were wrong, and should, when taken together, have been consistent and have presented the law of the case with accuracy and precision, that the jury might have received aid thereby in arriving at a true verdict.

For the error in giving these instructions for appellee, and the giving of appellee's fourth instruction as modified, the judgment of the Court below must be reversed and the cause remanded.

Judgment reversed.

Arkansas Railroads.

The following statement is made in a letter to the New York *World* from Mr. D. B. Sickles, late State Agent of Arkansas:

The total amount of bonds which may be issued under the provisions of the State aid law, is \$11,400,000, of which \$3,450,000 have been issued to the several roads now in course of construction. The following statements, furnished to me by Hon. Henry Page, State Treasurer, will exhibit the amount awarded to each of these roads and their actual condition:

	Length miles.	Award.	Completed Issued. miles
Memphis & Little Rock....	131	\$1,200,000	\$1,200,000 131
Little Rock & Fort Smith	150	1,500,000	900,000 89
L. Rock, Pine Bluff, N. O.	160	2,400,000	750,000 29
Miss., Ouachita & R. R.	170	2,550,000	450,000 20
Arkansas Central.....	170	2,250,000	150,000 ...
Kansas City & Fort Smith.	100	1,500,000	None. ...
Total.....	850	\$11,400,000	\$3,450,000 251

Memphis & Little Rock Railroad—completed and in running operation, 131 miles; Little Rock & Fort Smith—in running operation 80 miles; graded and ready for track, 50 miles; Cairo & Fulton—in running operation, 20 miles; graded and ready for track, 20 miles; Little Rock, Pine Bluff & New Orleans—in running operation, 20 miles; graded and ready for track, 62 miles; Mississippi, Ouachita & Red River—in running operation, 20 miles; graded and ready for track, 22 miles; graded, but not finished, 68 miles.

These are the only roads entitled under the law to receive State bonds. The \$3,000,000 awarded to the Cairo & Fulton Railroad was declined by the company, and that road is now being pushed forward to completion by Mr. H. G. Marquand and several other well known capitalists without a particle of aid from the State.

The Imports.

Our imports during the last six months of 1870 exceeded those of the last half of 1869 by over \$25,000,000. For the first six months of the current year the excess is estimated to be not less than \$60,000,000, making for the twelve months just past an increase of imports of some \$85,000,000 over those of the preceding year. The exports have also increased, but to no extent comparable to this, and there thus results an immense trade balance against the country. This showing is corroborated by the fact that the specie shipments are almost unprecedentedly large.

From 1850 to 1860 the population gained about 8,250,000, and the wealth about \$4,425,000,000. Assuming the increase of population evenly distributed through the ten years, and that of wealth to have been proportioned to the increment of population, the growth in national wealth in 1860 was nearly \$560,600,000. This augmentation consists of additional acres cultivated, more crops, farm improvements, new homes, additions to existing homes, more furniture, new factories and machinery, new stocks of raw material and manufactures, new warehouses of merchandise, new streets and highways, ships, steamers, piers and railroads. The \$500,000,000 was invested in all these and like needs. Suppose it to have been mainly absorbed in one or two directions. The result must have been immense importations to supply other necessities.

¶ In the last four or five years there has been a vast absorption of the increase of wealth in the building of railroads, while wants of other

kinds were multiplying, and were even aggravated by the roads thus built and put in operation. For instance, these roads create settlement, invite immigration, and increase population, and extend the agricultural region.

There is room for the apprehension that the excessive investment of capital in railroad building has prevented as great investment of it in other enterprises as was desirable, and that consequently a much larger proportion of needed articles has been imported from abroad. Connected with this fact must be taken the multiplication of wants, and of the means of supplying them, in the Southern States. The condition of things in that section has been steadily improving from a state of impoverishment in which wants were forced to go nearly unsupplied to a stage of comparative ability to purchase, and in this improvement the blacks have especially participated. The quantity of goods and wares of almost all kinds now annually sent South from St. Louis, for example, is far greater than at the best period of the Southern trade before the war. In effect, about four millions of consumers have been added to the country by the transformation of the slave, with his simple and few wants scantily met, to the emulous freedman, toiling for and aspiring to the estate of the well-provided citizen. There must be an increase of manufactures proportional to this and other multiplications of the demand, and such increase will take place as soon as there ceases to be more profitable attractions for capital.—*St. Louis Democrat.*

☞ Five hundred steamers, at least, leave our ports during the year for the British Islands or the continent of Europe. The recent European war has stimulated this foreign travel, the scenes of the strife supplying an immense interest to the traveler. Probably 50,000 tourists will use these steamers this year, and estimating that each tourist spend but \$2,500 we have a total of \$124,000,000 in gold that have really been taken from us. This is a large sum, and although some may think that it shows the extravagance of our people, it also speaks well for their prosperity. Nothing is more productive of good results than foreign travel. We shall, also, see the result of this outlay in a continual flow of emigrants to this country. We doubt not that all countries really profit by this mania for foreign travels.

☞ The simplest method of detecting adulterated tea, is to burn it and weigh the ashes. Any kind of tea, from the best down to the most common, must not leave over 5 per cent. of ash; while those adulterated sorts have actually given 35 to 43 per cent. of ash, proving that at least 30 to 40 per cent. of worthless or injurious stuff had been added. If a pound of such tea were to cost \$1, it would contain from 60 to 76 cents worth of tea, and some six ounces of plaster, sold for about 6 cents per ounce.

— Horatio Allen has handed in to the Poughkeepsie Bridge Company a plan for a suspension bridge 130 feet above the surface of the water, and 3,400 feet in length, with two spans of 1,100 feet in length, and half spans of 650 each, the towers to be of masonry and the foundations to be constructed 70 feet below the surface of the water. The cables are to be of steel or iron, and the carrying capacity of the bridge to be half a ton to the lineal foot. The whole structure is to cost \$2,600,000.

The Future of Pittsburg.

The *American Manufacturer*, in a well considered article upon the future greatness of Pittsburg, the Birmingham of the Western Continent, says:

Commencing with our leading manufacturing interest, iron, those who are best informed aver that the total capacity of our 32 rolling mills has been increased at least one-fourth during the past two years. One establishment alone numbers 96 puddling furnaces, and is capable of reducing 200 tons of pig metal every 24 hours. The additions made to the facilities of our 29 foundries proper during the past 18 months are even greater, a single establishment having increased its melting capacity more than sufficient to make an increase of one-sixth of the total melting capacity. It is within the mark to say that the melting capacity and corresponding facilities of our foundries have been increased at least one-third during the past two years. Pittsburg to-day possesses facilities for the reduction of 2,000 tons of pig metal per day.

During the last season a single run of coal took out from this port 8,488,000 bushels of our black diamonds. The total amount exported by river alone approximated 50,000,000 bushels.

The annual products of our steel works at the present time amount to upwards of 19,000 tons. Pittsburg supplies fully two-thirds of the entire amount of steel consumed in the United States.

The magnitude of the petroleum interest of Pittsburg can best be understood from the statement that in a brief period of five years the exportation of oil yielded to it a business and a circulation of money amounting to nearly \$47,000,000. The capacity of our 43 refineries in actual operation at the present time may be estimated at 40,000 barrels per week.

The annual production of our glass factories aggregates a value of nearly \$7,000,000. The annual production of our flint glass works alone aggregates upwards of 4,400 tons, worth upwards of \$2,000,000. Pittsburg makes half of all the glass made in the country.

In addition to these brief statements of a few of our leading industries, there is our lumber trade, aggregating \$7,000,000 per annum, our tobacco trade, our 26 tanneries, our 5 cotton factories, copper works, 56 breweries, 27 machine shops proper, plow factories, locomotive works, and hundreds of shops properly classed under the head of miscellaneous, in all of which, we may add, the increase of facilities keeps pace with the marvelous development of the leading interests, upon which they depend largely.

* * * It will be apparent, in view of the past and present of Pittsburg, that her citizens have no need to speculate concerning the future. Her position to-day is a sufficient guarantee of her future prosperity.

☞ According to a high German authority, recent investigations of a great variety of so called washing powders—many of them of loud-sounding pretensions and bringing high prices—showed that their efficiency depended entirely upon the amount of soda they contained, which was, in most cases of so poor a quality as to be of comparatively little value. The author advises the public, therefore, to have nothing to do with any such compounds, but to rely entirely upon obtaining a good quality of soda, which may always be secured and at a low price.

Gold as a Standard of Value Condemned.

The New York *Mercantile Journal* says: We can not discover a single valid objection to a currency of paper issued by the Government, the volume of which shall be adjusted at all times by its convertibility into interest-bearing government bonds, and re-conversion into legal tender notes, in both cases at the option of the holder. We earnestly desire that our contemporaries of the press should give this matter careful thought at an early day, waiving all prejudice in favor of this or that theory which tradition has handed down to us.

We say that gold is not now, never was and never can be a true standard of value. Ten dollars of gold, notwithstanding its present premium, will not buy as much corn, pork, beef, butter, cheese, tea, coffee, etc., to-day, as did one-half the same weight of the same metal 30 years ago. Gold is a commodity, and its value is governed by the law of supply and demand, the same as every commodity, and hence the use of it as a basis for our currency is a relic of barbarism unworthy of our times.

Does our legal tender paper dollar represent a dollar or not? It can not be said that it is a dollar, and yet that it is not; that is an absurdity. If legal tender notes are dollars, what right has the Secretary of Treasury to pay a large premium in legal tender notes for 5-30 bonds, upon which the five year option has matured? If they are not dollars, but promises to pay dollars, why are they not redeemed on demand? They have been for a long time outstanding, and still the Government neglects to pay them.

All parties are agreed that the country needs an elastic currency that will meet the requirements of trade at all times. We claim that the only method of protecting our currency is to issue a Government token, and make it a legal tender for all debts or demands public or private.

ANOTHER DRY-PLATE PROCESS.—Mr. H. T. Anthony has used as a preservative, says the *Photographic News*, gum tragacanth and sulphate of iron. He says: "In using this gum as a preservative, I found that an impression could be obtained by a very short exposure, but that it was impossible to get any intensity in the development. By adding a very small quantity of protosulphate of iron to the gum solution, its whole action was changed, and it became possible to develop pictures of extraordinary intensity."

—An experiment, known as the "lunch-basket system," has been recently tried on one of the railroads in England. It is designed for the accommodation of the traveling public, who have no opportunity to obtain refreshments on long journeys. The contractors furnish baskets of an easily portable and compact size and form, well stocked with the materials for a comfortable luncheon—that is to say, half a fowl, ham, bread and butter, cheese, salad, a pint of claret or other light beverage, plates, knives and forks, glasses and napkins—the price being three shillings. The baskets, which are made for the purpose, are provided with every necessity and convenience, and inside the lid is affixed a printed card, requesting that, as no deposit is required nor charge made for the use of the conveniences in the basket, all the articles be replaced in their proper positions, and the basket delivered up complete at the end of the journey.

COMBUSTION OF OXYGEN AND HYDROGEN.—An interesting experiment to show the combustion of oxygen in hydrogen, and of hydrogen in oxygen, has been published by Professor Thomsen. A pair of narrow platinum tubes, about $\frac{3}{4}$ in. long, but only a millimetre in diameter, are constructed of thin platinum foil, and by means of heat are fixed into a pair of small glass tubes. These are to be used as the burners of the two gases, hydrogen and oxygen. The glass tubes are then passed through openings about $\frac{1}{2}$ in. apart in an india rubber stopper, and the end of one tube is connected with the oxygen, the other with the hydrogen reservoir. After the cocks of the reservoirs are proportionately opened the hydrogen is ignited. The stopper with its two burners is then inserted into a glass tube, from 4 to 6 in. long, with its upper end considerably contracted, but still left open. The hydrogen now burns in oxygen, the melting of the orifice of the glass tube being prevented by the platinum burner. If, now, the oxygen be slowly turned off, and the supply diminished, the point is soon reached at which the quantity becomes insufficient to support the combustion of the hydrogen; the hydrogen flame expands, disappears for some moments, then reappears at the oxygen burner, and now without any interruption the oxygen burns in hydrogen. If the oxygen cock be gently opened, the flame withdraws itself to the hydrogen burner, and again hydrogen burns in oxygen. The phenomenon can be repeated as often as desired without extinguishing the flame, provided that the increase or diminution of the stream of oxygen is not made too suddenly, while the oxygen is burning an excess of hydrogen issues from the orifice of the large tube and can be ignited there, so that the combustion of hydrogen in the air and of oxygen in the hydrogen, is shown simultaneously.

The receipts of the Government during the past fiscal year were as follows: From customs, internal revenue, sale of public lands, and other sources, \$383,323,188 25. The expenditures during the year were \$292,177,188 25. Of this amount, \$125,576,565 93 was for interest on the public debt, and \$7,767,502 24 were expended upon the Indians. The expenses of the War Department during the year were over \$35,000,000. In addition to the expenditures above, \$130,735,147 19 were applied to the redemption of loans and treasury notes and purchase of bonds for the sinking fund, making the total disbursements, \$422,912,335 43.

—The cost of changing the Ohio & Mississippi locomotives from the six feet to the standard gauge was about \$3,500 each. Fifty cars belonging to the passenger stock were changed at the cost of \$150 each.

—Track laying on both sections of the St. Louis & South-eastern Railroad, from Mt. Vernon, Ill., and Enfield, eastward, is progressing at the rate of three-fourths of a mile a day. The track was to have reached Carmi, about eight miles east of Enfield, on the 23d.

—Preparations have been made for laying a third rail on the Albany & Susquehanna Railroad, between Albany and Nineveh, 120 miles, in order that cars of standard gauge may run through over it from Philadelphia to Montreal.

RAILROAD NOTICE.**The Cincinnati & Great Northern Railroad Company.**

The undersigned Corporators of the Cincinnati & Great Northern Railroad Company hereby give notice that more than ten per centum of the capital stock authorized by the Articles of Association of said Company has been subscribed, to-wit, eight thousand eight hundred and twenty (8820) shares; the said Corporators therefore give notice for the said stockholders to meet at the office of the Railroad Record, No. 167 Walnut street, Cincinnati, Ohio, on Saturday, the 30th day of September, A. D. 1871, at 11 o'clock A. M. of said day, for the purpose of choosing seven directors of said Company. A full attendance is requested.

A. J. HODDER,
DURBIN WARD,
T. WRIGHTSON,
S. W. MORTON,
ROBT. HEDGER,
Corporators.

CINCINNATI, O., Aug. 30, 1871.

31-8-71, 4.

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The Railroad Record.

E. D. MANSFIELD, - - - - - } Editors
T. WRIGHTSON, - - - - - }
A. J. HODDER, - - - - - }

CINCINNATI, THURSDAY, SEPTEMBER 14, 1871

The Railroad Record,

PUBLISHED EVERY THURSDAY MORNING,

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Increase of Capital Available for Public Enterprises.

One of the remarkable consequences of the war was the increase of active capital. We say "active," because as a general principle, the increase of capital, which is the increase of surplus profits, can not increase much faster than the increase of population, that is, of available labor. On this basis, the whole capital of the country can only increase at a certain fixed, regular rate. But that rate may be changed, as between fixed (permanent) and active capital; and that has been the fact. For example, the diminution of civil enterprises during the war, and putting the capital which would otherwise be employed in them into Government bonds, to the amount of \$2,500,000,000. But we will not speak of causes till we give the facts in regard to the present abundance of money. The following is an extract from the Monthly Letter of Kountze Brothers, Wall street, New York:

Tuesday, August 15th, 1871.

A month since the term "easy," amplified in sense, was expressive of the general financial condition, but at this later period, "plethoric" is the only word at all adequate to the purpose.

The superabundant means and the extraordinary resources of the centers of capital throughout the commercial world, as indicated by the rates of interest there prevailing, are more than remarkable, and may as readily excite apprehension as hopes.

That any actual increase has occurred in the aggregate of available means will probably be less correct as a conclusion, than that; in the lapse of time, the true condition has become more generally indicated.

The National Banks of the United States hold at present, deposits amounting to about 800 millions; nearly one hundred millions in

excess of the amount held a year ago, of which, the clearing house banks of this city show over 36 millions. Throughout Europe the condition is similarly expressed.

At this point interest rates are quoted at 2 @ 3 per cent.; in the London money market at 1 @ 2; on the Bourse of Paris at 4½ @ 5; at Berlin 3½ @ 4, and at Frankfort 2¼ @ 3.

As a consequence, not surprising, the condition of the monied institutions everywhere, accords with this exceptional state of the money markets, and the banks are found to have expanded their loans and discounts to an extent corresponding with the large sum of deposits, of which, in most instances, they are the unprofited recipients.

As further evidence of the increasing amount of active capital, and the low rate of interest, we may give the results of recent loan operations.

Just before the Government 5 per cent. loan was concluded, the State of Massachusetts wanted \$1,500,000, and it was offered in London and all subscribed at 5 per cent. in half a day. In a week more it was 3 per cent. above par. The Government loan of \$200,000,000 has all been taken at 5 per cent. These facts show conclusively both that money is very abundant and that the rate of interest is very low. The probable movement of money is to make money plenty and cheap. There may, of course, be fluctuations, and for a few months at a time money may be dearer, but, in the main, it is quite obvious the tendency which has now existed three or four years must continue for many years more, if not always. If this be so, it is plain that all public enterprises which offer a reasonable prospect of profit, such as railroads, manufactures, banks, &c., will find abundant capital for their purposes. This is a state of things which has not existed before in this country, and which must be regarded as the highest evidence of financial prosperity. In order to show the probable movement and results of the great money markets we will notice, in brief, the causes, and what are likely to be the consequences of this movement. The causes, though not commonly understood, are really both plain and sufficient:

1. The Government bonds, as we have before remarked, is one great cause, because it transferred capital from a permanent to an active state. For example, it is well known that during the war and a year or to after, say six years, there was much less permanent improvement made in the country. The men who would have improved farms or built factories went to the war; but inasmuch as their labor must be paid for, and it was paid for largely in Government bonds, hence the \$2,500,000,000 of U. S. bonds was an actual transfer of capital from a permanent to an active condition. But a large part of these bonds are held in Europe, and, therefore, must be excluded from the active capital of this country. We suppose, however, that full a thousand millions of these bonds are held in this country, and they act on the money market pre-

cisely as money, for they can all be cashed immediately. This fact made at once a great change in the monetary condition of the country.

2. In the six years since the war, there have been made 24,000 miles of railroad, at an average of \$40,000 per mile, which amounts to nine hundred and sixty millions of dollars. This is all represented by stocks and bonds. Of this amount we suppose not more than one-fourth is held in Europe, so that we have \$720,000,000 added to active capital in the last six years. There is now actually paid on this additional capital \$50,000,000 per annum, which is again active.

3. The crops have been good, and each year adds a large amount to the available capital of producers, merchants and manufacturers from this source, say, irrespective of farmers, \$50,000,000 per annum, or \$300,000,000 since the war.

4. For years there has been a great gain to the country in the matter of exchanges, which now amounts to almost nothing. Then there are now vastly greater banking facilities, and a much greater amount of private banking capital.

Now, when we put these considerations together, we find: First. That in Government bonds, railroad stocks and bonds, and mercantile capital, at least two thousand millions of dollars more of active capital than there was before the war. Second. That with this active capital there is also much greater facilities of exchange, banking, transportation, &c.

Thus we see that there are sufficient causes for the present state of the monetary market. Now, the question is, will it continue? For several years, we think, it must do so, subject to some fluctuations. Our reasons are:

1. All the elements which have now made active capital abundant still continue, except that of new issues of Government bonds, but that is not necessary, for the thousand millions of government bonds now in this country still remains an active fund, every dollar of it being as active as gold. In the meantime the interest on it becomes available for reinvestment.

2. There is each year ready for reinvestment the— 1. Interest on these National bonds; 2. Net profits of railroads; 3. The dividends on banks and insurance companies; 4. The surplus profits of agriculture, which go to the merchants and manufacturers. These results we estimate as follows:

Interest on Government bonds in this country.....	\$60,000,000
Net profits of railroads.....	120,000,000
Dividends on banks and insurance companies.....	70,000,000
Profits of agriculture in commerce	60,000,000
Dividends on manufacturing companies.....	50,000,000
To which must be added gold product.....	80,000,000
Annual profits on stocks.....	\$440,000,000

We hazard nothing in saying that two-thirds of this sum is available for future investments, for quite that proportion comes to wealthy men, capitalists and bankers. There is then nearly \$300,000,000 each year for new investments. This is the vast fund from which new railroads, factories and banks will receive their capital, and it is more than sufficient. Hence, we say that the condition of plenty and cheap money is likely to continue.

Lexington & Big Sandy Railroad.

Gen. J. C. BRECKINRIDGE, the vice president of the Lexington & Big Sandy Railroad, called on us at our office this week. The General is in fine health and good spirits over his enterprise. A little sunburnt, and muscles hardened by exercise in the saddle, in traversing the mountain regions through which the Lexington & Big Sandy is to pass, is the only difference in the General's personal appearance since we met him last. He says that they will complete their road; that he considers this, now, an assured fact. We are heartily glad of it, for we consider it a very important line of communication, although not constructed in the interest of Cincinnati. The truth is, the vast commercial interests of the country need the construction of all the shortest and best avenues of traffic, that skill, science and enterprise may indicate and complete, and still there will be room enough left for each city or town to enjoy its special advantages. We say again that we are really gratified at the good prospects reported by Gen. Breckinridge for the completion of the Lexington & Big Sandy Railroad, for of all the spots on the Lord's green earth in need of railroads, certainly Kentucky needs them the most.

Industrial Association of Georgia.

We have received from Hon. EMANUEL HEIBT, president of the Association, the Premium List; it is very full and extensive, and has a scope about equal to our best regulated "State Fairs." The "Exposition" is to be held at Savannah, Ga., commencing Nov. 21, 1871, and continue for five days. If the "Exposition" fills the bill, as laid down in the "Premium List," it can not fail to be of incalculable benefit to the industry of the State, and indeed of the entire South. Too much attention can not be paid to the fostering and perfection of agriculture science, or the mechanical industries in our Southern States, that are so full of the undeveloped resources of agricultural and mineral wealth. We trust the "Exposition" will be not only a success, but a triumph; and that, by the "rubbing together" in friendly competition of *genius* from all portions of our common country, as they are, by the rules, invited to do, that those sweet, friendly relations of a common brotherhood, so desirable in a progressive and ex-

pansive nation may be not only renewed, but begotten anew and strengthened with the increasing progress of our great and growing country.

Important Railroad Project.

CINCINNATI & GREAT NORTHERN RAILROAD.

On the 7th inst., an important railroad meeting was held at the Beckel House in this city. According to appointment the committee from Darke, Mercer and Van Wert counties, selected to obtain contributions for the completion of the old Cincinnati & Mackinaw Railroad, arrived here early in the morning, and were met in the afternoon by Colonel S. W. Morton, who it will be remembered was the purchaser of this road at the late receiver's sale, and the old president of the company, A. J. Hodder.

The conference of which we speak was at once organized, and an examination made of the contribution notes from the several counties. These were found to represent the gross sum of ninety-seven thousand dollars, which being within three thousand dollars of the sum originally proposed to be raised, it was considered sufficient, and at once accepted. This being done the balance of the purchase money of the road was paid to Mr. W. A. Weston, the receiver, and the whole transaction thus quickly and amicably closed.

The Darke county interest was represented by Messrs. Winner, Turpin and others; those of Mercer county by Hon. F. C. LeBlond and a large delegation of leading Germans from St. Henry and Van Wert. A contribution was presented by Messrs. McKim, Burt, Judge Clark, Barr and Fox.

After this business transaction was closed, these gentlemen, from various localities upon the line, entered into a general conversation upon the merits of the work they had undertaken, and expressed their deep interest in it, as well as a determination to do all in their power to forward its construction.

This, as we understand the matter, secures the construction of this grand old road; and from all we can learn of the gentlemen who have undertaken it, it will be done rapidly.

There were representatives at this meeting from the northern part of the State, and letters from leading men in Michigan, indicating the anxiety of the people north of Van Wert for a continuation of the line. Col. Morton gave sufficient encouragement to these parties to warrant them in waking up their local interests for this enterprise, hence we have no doubt that the work once renewed again will be continued until Lansing, Saginaw, and the valuable commercial points of the lower Michigan peninsula will be reached.

Our readers will remember that this road is now reorganized under the name of the "Cincinnati & Great Northern Railroad," and will be so known hereafter. The stock of the new organization was declared at \$4,000,000, and at the appointed time fixed by the law, the whole of the ten per centum required for the notice of the election of directors was taken, principally by Eastern gentlemen, in one day, and the time for the selection of the officers named on the 29th of this month. So soon as this event occurs, we are informed, the work will start with all the vigor that brains, experience, and capital can give it.

This is one of the best projects for Dayton that has been started for some time, and, we bid it God speed.—*Dayton Journal*.

Atlantic & Great Western Railway.

At noon of Friday, September 1, the Atlantic & Great Western Railway, with all the property connected with that organization, was formally transferred by the receiver to the trustees under the reorganization of the company. The transfer took place at Akron, and on its completion the three trustees, Gen. McClellan, Judge Thurman, of Ohio, and Mr. Duncan, of New York, took possession of the railroad and all its appurtenances, on behalf of the newly organized Atlantic & Great Western Railroad Company.

The new organization comprises all the various classes of bondholders, with the exception of a portion of the bonds held in Holland, and so many of the stockholders as signed the agreement and consented to the scaling down of their stock. It is believed that by far the greater portion of the stockholders have come into the arrangement. There is no opposition to the scheme on the part of the bond and stockholders who have not come into the arrangement, they merely preferring to take their chances outside of the arrangement. The Dutch bondholders have been paid their overdue interest, and are now working in harmony with the new organization. The stockholders who stand out do so because they think the investment is good, and that after the bonds have all been provided for there will be more value left in the common stock than is allowed for it now in scaling down for the new organization.

The trustees who now have temporary control of the property during the perfectment of the reorganization, will probably surrender their trust within thirty days to the company, when Gen. McClellan will become its president.

All arrangements with the Erie Railroad Company ceased at noon on Friday, and the two lines are now merely connecting roads. This, however, will work no inconvenience to the traveling or business public, who will have the same facilities as before, to say the least. Important changes are in contemplation, and will be commenced at once, the object of which is to make the Atlantic & Great Western independent of the Erie, while maintaining friendly relations with it.—*Cleve. Herald*, Sept. 2.

We do not know that we can add much to the above, except that we understand that the roadway is to be put in the best order, and that no pains or expense will be spared to continue the route under the new management, as it has been heretofore, in all essentials, a first-class route of travel and traffic.

Mr. McHenry and his associates are not novices in the science of railroading, and comprehend fully the wants and necessities of a road occupying the important strategic position of the Atlantic & Great Western Railroad.

W. B. SHATTUC, Esq., for so many years connected with the passenger department of the route, has been appointed the General Ticket Agent. The mantle of this important position could not possibly have been placed on shoulders more able, energetic, or competent. If all the other appointments on the line are equally judicious and circumspect, if the line does not meet the expectations of

owners, the difficulty must be sought for elsewhere than among the officers. We wish them *bon voyage*.

Fire Report.

(From the *Chicago Republican*, Aug. 16, 1871.)

The following is W. H. Sloan, Fire Reporter's summary of fires for the four months ending July 31, viz:

Division.	Alarms & Still Fires.	Estimated Loss.	Ins. involved.	Prob loss to Ins. Co.
South.....	74	\$39,675	\$176,850	\$32,544
West.....	78	41,165	94,650	33,490
North.....	38	5,101	18,450	4,300
Total.....	190	\$85,941	\$289,950	\$70,334

Originating from carelessness, 67; gasoline, 17; incendiarism, 23; sparks from chimneys, 2; overheated stoves, 4; defective stoves and chimneys 20; unknown, 50; gas explosions, 3; spontaneous combustion, 4; total, 190.

The efficiency of the Babcock Extinguisher in suppressing 25 of the above fires, some of which were very threatening, is the highest proof of its value to the department, and the insurance companies.

(Special Despatch to *Chicago Times*, Aug. 18, 1871.)

Boston, Aug. 19.—The Sea View House, at Rye Beach, N. H., was saved from destruction by fire, on the night of the 16th, by means of a Babcock Extinguisher.

We learn from gentlemen residing in Lewis county that there is hardly a doubt of that county giving a handsome majority for a subscription to the Kentucky & Great Eastern Railroad. It would be strange indeed were it otherwise. This is the only opportunity Lewis will ever have of getting a railroad, and by voting the subscription the building of the road will be rendered certain. It will run along the length of Lewis county nearly or quite thirty miles, and the amount of money that will be expended for labor in Lewis will be fully \$300,000. During the progress of the work there will be a ready market right at the doors of the Lewis county farmers for all the articles they usually ship to other places, and this at good prices. The cross-ties for the most of the road from Newport to the Big Sandy must be purchased in Lewis county, and the amount of money that would be brought into the county from that source alone would amount to not less than \$100,000. The valuable stone quarries in Lewis would then be within a few hours of the best markets at all seasons of the year. If anything can bring Lewis out, it will be the railroad, and that will almost certainly do it. Vanceburg would then be nearer to New York city in point of time than she is to Cincinnati, and the people of Lewis have sagacity enough to understand what an immense advantage to them that would be.—*Maysville Eagle*, Sept. 6th.

Col. S. W. Morton and Mr. A. J. Hodder reached this city on the Nashville on Sunday morning. On yesterday they were engaged in maturing and drawing a proposition to place before the County Court for submission to the voters of this county. They completed that part of their work, and the favorable action of the Court alone is wanting to get the matter before the people in a formal shape and to set the ball in motion.—*Maysville Eagle*, Sept. 6th.

East End Improvements.

A meeting of the General Committee on Parks, appointed at the mass meeting of citizens held on Walnut Hills last month, took place at the Board of Trade rooms. In the absence of the regular chairman, Mr. Joseph Kinsey acted as presiding officer.

The following report from a sub-committee on filling up Deer creek was read by the chair:

Harry R. Smith, Chairman of the Joint Citizens' Committee for City Improvements:

Your committee to examine the improvement of Deer creek valley met—Wm. Sumner, O. J. Dodds and Joseph Kinsey present—and beg to report as their opinion that the plan recommended by the Board of City Improvements, to make the old Deer creek road to the old grade, would go far toward redeeming that valley, and should be carried into execution at once. This will fill up the valley sufficiently to lead the sewage into the Eggleston sewer, thus redeeming Deer creek valley without expense to the city, and at the same time helping property-owners.

Your committee would also urge upon the City Council the completion of Effluent-pipe street at the grade recommended and adopted by the Board of City Improvements and Water Works Trustees, which will not obstruct the Deer creek road, as it can pass under it through an arch. This road seems absolutely necessary for the increasing travel to reach Walnut Hills, and afford a permanent structure to pass the water pipes on from the new reservoir.

The improvements can be made just at this time, while the Tunnel Railroad is being built, under the most favorable circumstances, as the Cincinnati & Dayton Railroad, known as the "old tunnel road," has emerged from its old embarrassments, and a contract made with responsible parties to make it, and the work is to be commenced immediately.

The tunnel road is but a link in a great network of roads that are to be of vast importance to our city, connecting with the lakes on the north and the Gulf and Pacific on the south and south-west; also with a short line to New York by the Kentucky & Great Eastern Railroad, which is in the hands of energetic parties, and we understand is to be built at once. This road is to be made along the south bank of the Ohio river to Catlettsburg, thence to Frederick, Maryland, there to meet and connect with the New Jersey Central road, making one line to New York, which will be 106 miles shorter than by the Panhandle road, which is the shortest route at present, and 137 miles shorter than the Baltimore & Ohio, 221 miles shorter than the Atlantic & Great Western, and 240 miles shorter than the New York Central. While adding another to our four through lines to New York, over better grades and straighter lines, it gives us connections over shorter lines to Norfolk and Richmond, Va., Washington City, Baltimore and Philadelphia, thus giving to Cincinnati what will be equivalent to a new railroad to all these important seacoast cities. We thus become the hub in the central cities of the country, and ere long the Queen City will be enabled to replace her crown in the race for enterprise and population. The gentlemen who have these new roads in charge are with us, and we are informed, busy in completing arrangements for carrying forward their work; and all they ask from our citizens is a connection for these roads through our city, which can be granted through Eggleston avenue,

now, before it is graded and finished; then it can be improved on a grade to accommodate the immense railroad traffic required so as to pass the cross streets over it, making it safe for travel, and affording room for buildings and warehouses that will accommodate the class of new business that these roads will surely bring to us.

We trust our City Council will find it to the city's interest to be liberal in granting the necessary privileges for all connections through our city.

Returning to the improvement of Deer creek road and Effluent-pipe street, no better time can ever be than the present—while that tunnel is being made—as the fills required can be made very reasonably with the material that is being taken from the tunnel. On examination we find all the buildings in that valley have been made with reference to the grade established, so that business men and lot owners in that valley are ready for the work, if the Board of Improvements and Council will order it forward.

JOSEPH KINSEY,
WILLIAM SUMNER,
O. J. DODDS.

Progress of the Narrow Gauge.

— Little Rock advices (26th) state that a contract has been closed for the iron and equipments of the entire line of the Arkansas Central Railroad, including the branch from Aberdeen, on White river, to Pine Bluff, and from Aberdeen to Clarion, all to be delivered by April 1, 1872. This is a narrow gauge road, and will be the first road completed of that gauge in the South. This is the only railway in the State to which State aid has been awarded that has moved along quietly. Everything points to its early completion.

— The people of Jackson, on the 23d, voted by a large majority to issue \$160,000 of bonds in aid of the Leavenworth & Denver Narrow Gauge Railroad. Surveying parties are already at work locating the line, and the road is to be pushed through with all possible dispatch.

— The *Register* says the Des Moines & Western Railroad has assumed definite shape and already begins to promise to fulfill the prediction, made some time since, that it would be the first narrow gauge road in operation in Iowa. The tax will certainly be voted in enough townships to raise, west of Waukegan, \$100,000. As the route is one that will be of cheap and easy construction, this sum will make its immediate building certain. If the elections shall be favorable, work will be begun at once, and the whole line graded in 60 days! This has the ring of business.

— The Memphis, Bolivar & Nashville Narrow Gauge Railroad is being built from Memphis to Raleigh, and will be immediately extended to Somerville. Its proposed extension is through the Loosa Hatchie bottom, passing Leatherville and Bolivar, Hardeman county. Thence crossing the Hatchie it goes to Crainsville. From that point the proposed route is up the Little Hatchie bottom to Camden, thence through Bethel and Purdy to Savannah, connecting there with the direct road from Nashville through Columbia to Waynesboro, making nearly an air line from Nashville to Memphis. The route, it is claimed, is of easy grade, there being but one hill of importance between Bolivar and Somerville. The proposed road is quite an important one.

New York State Railroads.

According to the report of the State Engineer and Surveyor for 1870, the number of railroads in New York, operated by steam, is 164, with a capital stock paid in of \$234,225,159; the number operated by horse power is 106; the number of companies organized during the year is 42; and the number of enactments relating to railroads, passed by the Legislature during the year, is 51. The total cost of construction and equipment of roads operated by steam is stated to be \$249,228,896 19, and of roads operated by horse power, \$23,481,268 74. The total earnings of roads operated by steam, for the year, is set down at \$69,549,444 03, and the expenses of the same, \$69,378,455 20. The total earnings of roads operated by horse power, for the year, is stated at \$9,523,892 83, and the expenses of the same, \$9,681,729 24. The number of people killed during the year was 269 on the steam and 29 on the horse roads, and the number injured, 264 on the steam and 103 on the horse roads. The length of steam roads is 7,166 miles. The following deductions from the reports of several of the principal steam companies for nine years, showing the average sum per ton per mile for freight, the average cost per ton per mile for transporting the same, and per centage of transportation expenses to gross earnings, will be found of interest:

AVERAGE PER TON PER MILE IN 1870.

Name of Road.	Rec'd for tr'pg.	Cost of transportation	Per cent of expenses on gross earnings.
Erie Railway.....	1.38	0.48	74.62
Lake Shore & Michigan Southern.....	1.59	1.04	62.93
New York Central & Hudson River.....	1.86	1.15	63.36
New York & Harlem.....	6.57	4.45	62.21
Ogdensburg & Lake Champlain.....	2.57	1.62	62.08
Rensselaer & Saratoga.....	3.95	2.65	59.63
Rome, Watertown & Ogdensburg.....	3.75	2.92	64.19
Syracuse, Binghamton & New York.....	1.43	0.76	58.34

The construction of railroads in the State has made gratifying progress, but their management does not seem to have improved. Grave abuses have crept into the direction of some of the leading companies, but the most serious aspect is the tendency to consolidation. The corporate system, in at least one instance, has been practically broken down, and the stockholder no longer has a voice in the management of the corporation; hence the existing railroad system is unsatisfactory, if not dangerous. One of the possible remedies for existing evils, advocated with marked ability by an eminent writer on jurisprudence, is the assuming of railroad jurisdiction by the National Government, as has been done in some parts of Europe, and, it is stated, with good results. This reform is advocated because of the alleged failure of the corporate system, as regulated by State authority. We are told by the same authority, that the preliminary work to this reform should be done through the States—State management to begin in fragments of trunk lines, because local lines can not be purified, while the through lines are amenable to no law. The community demand reform of the through lines, and perhaps effective regulation will do more than State ownership. This is the tendency in Western legislation, where Illinois, in the remarkable constitution lately adopted, views and regulates railroads as an exceptional pursuit, to be recognized and treated as such. The provisions introduced are crude, but a

deficiency has been recognized, a starting point taken, all of which is hopeful. The abrogation of special legislation achieved, is, in itself, an important point gained. When a means to the end of checkmating railroad influence in the Legislatures shall be found and incorporated, the difficult part of the railroad problem will, without doubt, have been solved. The Illinois experiment absorbs attention as one of the leading problems of railway management. The result of that experiment will be valuable as a guide to other localities.—*Com & Ship. List.*

—Redeeming the Debt in Coin.

The commencement of the Fall season has been enlightened by the publication of the anticipated Treasury order for the redemption of a portion of the outstanding Five-twenties, in accordance with the terms on which the balance of the new five per cent. Funding Loan was negotiated. The amount nominally called in is \$145,666,800 of the loan of May, 1862, consisting of coupon and registered bonds. But as from \$40,000,000 to \$50,000,000 of these bonds have been already purchased on account of the Sinking Fund, or exchanged for the new loan, the amount to be actually redeemed is reduced to about \$100,000,000. The bonds to be redeemed are of the first series, act of May 1, 1862, numbered as follows:

COUPONS.				
1 to 30,699,	inclusive,	of \$50	each.	
1 to 43,572,	do	of 100	each.	
1 to 40,011,	do	of 500	each.	
1 to 74,104,	do	of 1,000	each.	
REGISTERED.				
1 to 595,	inclusive,	of \$50	each.	
1 to 4,103,	do	of 100	each.	
1 to 1,839,	do	of 500	each.	
1 to 8,906,	do	of 1,000	each.	
1 to 2,665,	do	of 5,000	each.	
1 to 2,906,	do	of 10,000	each.	

On and after the 1st of December next, these bonds will be paid in the Treasury Department, Washington, in coin, and interest will cease from that date. The further development of Mr. Boutwell's policy in reference to funding the rest of the debt, will no doubt exercise an important influence on holders of outstanding bonds. The Secretary is authorized by law to increase the 5 per cent. loan to \$500,000,000, so that he still holds a balance of \$300,000,000, which he will probably distribute proportionally with subscriptions for the 4 and 4½ per cent. bonds, which have been only temporarily withdrawn.

The fact that the United States Government is in a position to redeem its war debt can not fail to exercise a favorable influence on American credit. It would have been more desirable if this result had been achieved, as it might have been, through the preliminary medium of the restoration of the currency to a gold basis, and without the fearful strain that has been imposed on the industry of the country. The negotiation of the Loan and the redemption of the debt are important as indicating clearly that 5 per cent is henceforth the maximum interest that will be paid for money by the United States Government. This fact must exercise a large influence on the whole list of securities, as many investors will desire to receive larger interest for their money than is henceforth attainable from Government bonds.—*Economist.*

Railways Raise Land Values.

A respected correspondent and friend sends us the following interesting details. Under the title "Influence of the Burlington & Missouri Railroad on South-western Iowa," he says:

"The valuation of land and town lots in three contiguous Iowa counties in 1869 was \$3,773,730; in 1871 the same lands and lots were assessed at \$5,705,429—a gain of \$1,931,699, or more than 51 per cent. in two years. These counties are Union, Adams and Mills. The only obvious reason for this rapid increase in values seems to be that within the last two years the B. & M. Railroad has been extended through the three exceptional prosperous counties—raising up villages at Corning, Villisca, Emersnn, Malvern, and, indeed, at every station—bringing in all things needful, and carrying produce to market. The railroad has, also, since April, 1870, sold to actual settlers, on ten years' credit and low interest, about 38,000 acres in those counties, or more than one-third of its government land grant there. The potency of a railroad to induce settlement, extend agriculture, develop all resources, and hence enhance values, though always indubitable, is seldom so susceptible, as in this instance, of mathematical demonstration, and that in a nutshell.

"The assessments, as equalized by the Supervisors of Montgomery county, I regret that I have not yet received. When they come to hand, I shall doubtless ascertain that the valuation there has increased more rapidly than in any of the three counties I have mentioned in its neighborhood, for the railroad has traversed it more fully than either of the others; it has sold more land within its limits than in all the others together; and it has stimulated its county seat, Red Oak, to a growth faster than any new town in Southern Iowa—perhaps faster than that of any town in the whole State. Nor has it half finished its beneficent work.

"Just as I had written the foregoing paragraph the statistics of Montgomery county, from its Auditor, came opportunely to hand, and verify my prediction above. The total valuation of that county in 1869 was less than a million (\$993,052), in 1871 it was nearly three millions than two (\$2,544,386), showing an increase within two years of more than a million and a half (\$1,551,334). This increment within two years is more than five times the percentage of growth even in the prosperous counties adjoining on the East and West—namely, 272 per cent. Meantime, the population of the county seat, Red Oak, has increased from 820 to 1,844. The secret of all this advancement is simply the fact that in 1869 Montgomery county had not a single mile of railroad—and that in 1871 it has forty miles. The locomotive bringing in whatever is needed from abroad, and carrying to market whatever is not needed for consumption at home, has breathed its own miraculous energy into every inhabitant, and pervasive as the spring-time has left no corner of the county untouched with its vivifying power.

"The sales of railroad land in Montgomery since April, 1870, have amounted to 48,052 acres, and about 50,000 acres still remain to be sold.—*Review.*

—Of the 307,000,000 of people carried on English railroads in 1869, only 17 were killed by causes beyond their own control, while in the streets of London 150 persons were killed; and it is estimated that the orange peel thrown on London pavements kills more than all the English railways.

State Debts and Liabilities.

We have not seen anywhere a tabular exhibit of State indebtedness, and have therefore been at considerable pains to make an accurate and reliable compilation, giving the aggregate debt of each State, at the date of its last official publication, as follows:

State.	Date.	Total.
Alabama.....	Oct. 1, 1870	\$16,958,010 75
Arkansas.....	Apr. 27, 1871	6,150,000 00
California.....	May 1, 1871	3,506,000 00
Connecticut.....	Apr. 1, 1871	6,775,900 00
Delaware.....	May 1, 1871	1,402,000 00
Florida.....	Jan. 1, 1871	1,288,697 76
Georgia.....	Jan. 1, 1871	7,514,500 00
Illinois.....	Mar. 1, 1871	1,893,496 00
Indiana.....	Oct. 31, 1870	4,167,507 94
Iowa.....	Jan. 1, 1871	300,000 00
Kansas.....	Dec. 31, 1870	1,341,675 00
Kentucky.....	Oct. 10, 1870	3,072,677 00
Louisiana.....	Jan. 1, 1870	22,560,233 00
Maine.....	Jan. 1, 1871	8,067,900 00
Maryland*.....	Sept. 30, 1870	13,317,475 73
Massachusetts*.....	Jan. 1, 1871	16,682,068 00
Michigan.....	Mar. 27, 1871	2,376,292 78
Minnesota.....	May 1, 1871	350,000 00
Missouri.....	Jan. 1, 1871	17,866,000 00
Nevada.....	May 1, 1871	660,000 00
New Hampshire.....	Jan. 1, 1870	2,752,200 00
New Jersey.....	Nov. 1, 1870	2,896,200 00
New York*.....	Oct. 1, 1870	32,409,144 42
North Carolina.....	Oct. 1, 1870	29,960,045 00
Ohio.....	Nov. 5, 1870	9,675,343 73
Oregon.....	Sept. 5, 1870	106,633 00
Pennsylvania.....	Dec. 1, 1870	31,107,186 85
Rhode Island†.....	Apr. 1, 1871	2,774,000 00
South Carolina.....	Oct. 31, 1870	7,665,908 98
Tennessee.....	Jan. 1, 1871	38,945,852 00
Texas.....	Jan. 1, 1871	930,000 00
Vermont.....	Jan. 1, 1871	1,227,000 00
Virginia.....	Dec. 31, 1870	47,390,839 96

Sum total.....\$344,090,787 90

*Less sinking fund

†Since April 1, 1870, reduced by \$142,000.

Mississippi, in 1838, created a debt to the amount of \$7,000,000 for the establishment of banks. The State soon ceased to pay interest on these bonds, and has long since wholly repudiated them.

Nebraska has so far incurred no debt.

West Virginia has no State debt, except such portion of the debt of Virginia as might equitably fall to her share. West Virginia may assume such portion of that debt.

Wisconsin has no debts, except such as are invested in trust funds, created for the support of schools, benevolent institutions, etc.

The above exhibit shows that the Western States, considering area, population and resources, are least in debt, and that local taxation, for many years to come, is likely to be much lighter in our section than in any other. Here, too, the number of inhabitants and the development of material advantages are augmenting at a ratio not paralleled in any other part of the country, making the burden of State debt easier and easier to be borne with every passing year. Indeed, it is altogether probable that all the Western States, with the exception of Ohio and Missouri, perhaps, will be completely out of debt before the close of the present decade.

State debts in New England, outside of Massachusetts, are generally confined to war loans, and are in process of extinguishment.

The large indebtedness of the Southern States has been created principally since the close of the war, by a reckless system of almost indiscriminate aid of railroads. Tennes-

see and North Carolina in particular have been brought to the verge of bankruptcy by this course of loaning their credit. Few of the roads so aided are paying the interest on the bonds issued to them, and some have literally swindled the State.—*Chicago Mercantile Journal*.

Journal of Railroad Law.

RAILROAD COMPANIES—WHAT CONSTITUTES NEGLIGENCE—FAILURE TO RING BELL OR SOUND WHISTLE AT PUBLIC CROSSINGS—PRESUMPTIVE EVIDENCE.

The recent case of *The St. Louis, Jacksonville & Chicago Railroad Company vs. Terbune* (50 Ill. 151), was an action on the case brought by Terbune against the St. Louis, Jacksonville & Chicago Railroad Company, to recover for damages resulting from an alleged violation of the statute, imposing upon the railroad companies the duty to ring the bell or sound the whistle upon the engine at the crossing of public highways, as therein provided. The plaintiff alleged that by reason of the failure of the defendant to comply with the statute in that regard, two cows, property of the plaintiff, of the value of \$300, were run over and killed. On the trial the jury returned a verdict for the plaintiff, and assessed his damages at \$150. A motion for a new trial was overruled, and final judgment rendered upon the verdict. The defendants bring the cause to this Court on appeal, and assign various errors upon which they rely for reversal.

The following is the opinion of the Court delivered by

WALKER, J.—The question of the weight of evidence was for the jury, and they having determined it, we will not disturb their finding, unless it is not supported by the proof. It is their province to weigh and reconcile where it may be done, and if not, then to give it such effect as it is entitled to receive, rejecting such portions as may be unworthy of belief, and giving due weight to such as they may believe to be true. In this case there was a conflict of evidence as to whether a bell was rung or a whistle sounded for the distance required by law before reaching the road crossing where the cattle were killed. The jury having found there was not, we are not prepared to hold their finding is not supported by the evidence.

Appellants insist that the Court below erred in giving appellee's third instruction. It informed the jury that the omission to ring a bell or sound a whistle at the road crossing as required by the statute, was *prima facie* evidence of negligence. In the case of the *Galena & Chicago Union R. R. Co. vs. Dill* (22 Ill. 271), it was held that it was a question of fact, to be determined by the jury, whether such an omission is negligence. In that case, the statute imposing that duty on railroad companies had been repealed as to that road, and hence it was a question arising under the common law, whether such an omission was negligence. That case is not, therefore, an authority in this, as the question presented by this instruction is whether the omission of a duty imposed by the statute constitutes *prima facie* negligence, or whether in such a case the plaintiff is bound to prove other omissions of duty which constitute negligence. In the case of *The Great Western R. R. Co. vs. Geddis* (33 Ill. 304), which was similar in its facts to this, it was held that the failure to ring a bell or sound a whistle at a road crossing was

negligence that should render the company liable for injuries growing out of the omission, that might be occasioned by their engines, to persons or property; that the omission to perform an act imposed by the statute was negligence. In that case the cases of *The Illinois Central R. R. Co. vs. Phelps* (29 Ill. 447), and *The Illinois Central R. R. Co. vs. Goodwin* (30 Ill. 117), were referred to and distinguished from *Geddis'* case. It was said of those cases that the animals were killed at a place where the statute did not require the signal to be given, whilst in *Geddis'* case the injury to the animal was at a highway crossing where the signal was required.

That case was in point and must govern this. The Court below did not err in giving this instruction. No error being perceived in this record the judgment of the Court below must be affirmed.

Judgment affirmed.

TINTING THE ELECTRIC SPARK.—M. E. Becquerel has shown that the electric spark may be diversely and beautifully colored by being made to pass through saline solutions. If an electrical spark from an inductive apparatus be made to pass into the extremity of a platinum wire suspended over the surface of the solution of a salt, this spark will acquire special coloration according to the chemical composition of the solution traversed. The saline solutions are best concentrated, and the platinum wire positive. The experiment is readily performed in a glass tube. Salts of strontia will color the spark red; chloride of sodium, yellow; chloride of copper, bluish green, &c. The light from these sparks, analyzed by the spectroscope, furnishes a method for the determination of the nature of the salts contained in the solution.

Cleveland has surpassed almost every other American city in growth during the past decade, and manufactures did it. The *Herald* says the city now has 14 rolling mills, with 200 puddling furnaces, and a daily capacity of 400 tons of finished iron. There are 5 stove foundries, 1 malleable iron works, 1 ax and tool company, 6 boiler plate and sheet iron works of large capacity, 3 foundries for making car wheels and castings for buildings, 1 large manufactory of cross-cut, circular and other saws.

COFFEE AND CACAO AS FOOD.—Some experiments have been made with dogs, to which Dr. Rabuteau gave diets in one case consisting daily of 20 grms. of bread, 10 grms. of fresh butter, and 10 grms. of sugar; in the other case, 20 grms. of cacao, 10 grms. of sugar, and an infusion of 20 grms. of well-roasted coffee. From the results of these experiments, he concludes that coffee and cacao simply prevent denutrition or waste. This view is objected to, however, by MM. Payen, Dumas, and Chevreul. As regards cacao (commonly named cocoa), there can be no doubt that, containing as it does from 17 to 20 per cent. of albuminous matter, with from 10 to 12 per cent. of starch, from 40 to 50 per cent. of fat, and among its mineral matter phosphates, it is nutritious food. M. Chevreul calls attention to the existence of idiosyncrasy, and its influence on the individual tastes, and hence also more or less on the action of various alimentary substances, pointing out that he himself has had from his earliest years, an invincible repugnance to wine, milk, fish, and various vegetables, of none of which he ever partakes, but for all that it would, of course, be absurd to deny the nutritive properties and value of these substances.

The Supply of Coal in England.

Some years ago considerable alarm was created in England by a statement to the effect that the coal area in that country was considerably less than was generally supposed, and that the supply would be exhausted within a period of about two hundred years. A Board of Commissioners, consisting of experts and scientific men, was appointed by Parliament, and after a patient and laborious investigation of five years the results are given to the world in a very comprehensive and elaborate report.

The Commission partially confirms the alarmist reports about the short supply of coal. The only difference is in respect to time. In place of exhausting the coal fields in a couple of hundred years as was first reported, it is estimated that according to the arithmetical rate of increase in consumption for a number of years past, the supply will last 277 years. By a moderate geometrical diminution in the increased consumption, which would utilize much coal that is now wasted, the supply may be made to last 360 years. If the future increased consumption is limited or prohibited to the amount consumed during the year 1871, the supply may last 1,300 years. In other words, if England stands still it may continue to exist 1,300 years. But if it increases its manufactures and wealth in the future at the rate of progress during the first half of the present century then there will be an end to all this greatness and power in about 300 years. "As it is no more possible for nations to stand still than individuals, we may assume that England will be either unable or unwilling to limit the consumption of coal, but will go on like a wasteful heir, exhausting the vital springs of prosperity until the inevitable results of poverty and weakness succeed the loss of capital.

The report is exceedingly valuable in information. Experience confirms theory by showing that coal can not be procured at a lower depth than 4,000 feet, on account of the regular increase of heat. This increase is at the rate of one degree for each sixty feet. The mines at fifty feet below the surface maintain a constant temperature of fifty degrees in winter and summer. At the Rose Bridge mine, 2,419 feet deep, the temperature is uniform at ninety-four degrees. A mine in the tin regions in Cornwall is sometimes 123 degrees, and men can only work in it for spells of fifteen minutes. At 4,000 feet the temperature would be 105 degrees, and this is the highest at which coal can be profitably obtained, until men become like salamanders and able to live in a region of perpetual boiling water. The attainable quantity of coal in the known coal region is 96,207,000,000 tons. This would only last about 180 years. But it is estimated that an additional supply of 56,273,000,000 tons may be obtained in districts not yet worked or regarded as workable. This gives a total available quantity of 146,480,000,000 tons, which may last either 300 years or 1,300 years, according to the rate of consumption.

Thus, science pronounces the unalterable doom of the English nation. It must absolutely lay down its sceptre within a determinate period. That period seems so remote that forebodings and regrets seem about on a par with Mark Twain's tears at the tomb of his ancestor Adam. Nevertheless it is impossible not to forecast a future in which such great changes are not merely problematic. Within the same period of time that marked the rise and growth of the people and Republic of the United States, the English nation is destined to disappear. What Sheffield, Manchester, and the other great manufacturing towns of England would be when deprived of the motive power that drives its steam engines and keeps its furnaces in blast, is only too apparent, and it is probable that in comparison a battle of Dork-

ing might be more desirable. It is estimated that the machinery of England is equal to the manual power of the entire population of the globe. What that country would be, deprived of this wonderful auxiliary power, belongs to the future to decide.

There is just one chance to relieve. It is possible that science which thus pronounces the doom of England may find means to give it a new lease of existence. New motive powers besides those derived from coal and steam may, and probably will be discovered or rather utilized. Already it is known that electricity or magnetism offers practically exhaustless sources of heat and power. Nature contains within her mighty storehouse, many fruitful bounties to bless mankind—bounties which are only limited by human ignorance and incapacity. The day may not be distant when the locomotive and steam engine may be regarded as much behind the times as the old-fashioned stage coaches and hand looms are now regarded.

It is also to be observed that the investigations of the Coal Commission was limited to England. It is known that there are very large supplies of coal in Ireland, and that the mines of that country are regarded by scientific men as superior both in quantity and quality to those of England. History contains many greater surprises than would be involved in the transfer of the seat of wealth and power of Great Britain from England to Ireland—from the Thames and Mersey to the Shannon and Boyne. Certainly the mere possibility of this change or reversal of the present relation between England and Ireland affords a curious solution of the Fenian agitation and of the English penal laws.

HOW TO BANISH FLEAS.—The *Maryland Farmer*, a most excellent monthly, published in Baltimore, gives the following useful recipe for exterminating fleas:—"The oil of pennyroyal will certainly drive these pests off; but a cheaper method, where the herb flourishes, is to throw your dogs and cats into a decoction of it once a week. Mow the herb and scatter it in the beds of the pigs once a month. Where the herb can not be got, the oil may be procured. In this case, saturate strings with it and tie them around the necks of dogs and cats, pour a little on the back and about the ears of hogs, which you can do while they are feeding without touching them. By repeating these applications every twelve or fifteen days, the fleas will flee from your quadrupeds, to their relief and improvement, and your relief and comfort in the house. Strings saturated with the oil of pennyroyal and tied around the neck and tail of horses will drive off lice; the strings should be saturated once a day."

INTENSIFYING VARNISHED NEGATIVES.—There are several methods of intensifying a varnished negative. You may remove the varnish by means of alcohol, and intensify with an alcoholic solution of pyro and silver; but the simplest method is one we (*Photographic News*) introduced some years ago. It consists in first moistening the varnished film with alcohol, and then applying a six-grain solution of iodine in alcohol. The change will be chiefly observable in color. The iodine combining with the silver will form iodide of silver. The stage at which to stop the operations is when the deposit forming the image assumes an olive tint; throw off the iodine solution at once, and rinse with alcohol, then dry. If necessary, you can again varnish, but that is not usually necessary. If the application be continued too long, the color will become yellow and transparent; but if stopped at the olive stage, the color is very non-actinic, and considerable accession of intensity is gained.

THE SHAPE OF SAW-TEETH.—The following information on this subject is extracted from *Leffel's Mechanical News*:—"The adaptation of tools, in form and construction, to the nature of the work required of them, is an important item in every branch of mechanical industry, and in none more vitally than in the sawing of lumber. The distinction to be made according to the direction in which the saw is to run, whether across the grain or with the grain, is sufficiently plain, and is familiar to every workman in a sawmill. As the fibre of the wood to be severed in cross-cutting presents a firm, almost unyielding resistance to the saw, the teeth are of an acute, or lancet-like shape, cutting the wood rapidly asunder, as if with a succession of knives, and producing a fine granular saw-dust; while the teeth of the rip-saw, cutting with or separating the grain, are made comparatively large and coarse, encountering less resistance from the wood, which they tear into small chips or shavings. The experience of workmen in soft, and especially in gummy or resinous woods, such as pitch-pine, larch, etc., gives still more striking proof of the necessity of adapting the saw to the nature of the material in which it is to operate. To prevent the choking of the saw, and the resulting demand for additional power to maintain the motion, the points of the teeth require to be made acute, and to have considerable pitch, in order to overcome the obstruction of damp sawdust accumulating in their path; and in gummy wood, an application of grease is often necessary as a remedy for the heating and friction caused by the tendency of the resin to adhere to the saw. It may be stated, in general terms, that for soft or yielding woods, of the class of which the willow and pine are common examples, the pitch should be greater, and the teeth large and acutely pointed. For mahogany, rosewood, and other woods of tough and dense fibre, teeth of less size and of perpendicular pitch are appropriate. The principle which should govern the shape of saw-teeth is indeed an extremely simple one, and would seem to require no formal statement, more especially as it is certain to make itself manifest, if disregarded, upon a brief experiment. In practice, however, it often fails to receive due attention, and no small amount of inconvenience and actual loss is occasioned by neglect of this material point."

HOW TO PRESERVE FATS.—Every pharmacist, says the *Journal of Applied Chemistry*, experiences great difficulty in the preservation of fatty compounds. During the hot weather of summer and in the warm atmosphere of the shop in winter, ointments and pomades become rancid and useless. This is particularly the case in those compounds into which animal fats enter largely. The chemistry of these changes is apparent to every intelligent pharmacist. The usual mode of benzoating fats is to mix with them tincture of benzoin. The objection to this is that there is often a certain quantity of moisture in lard, especially that which is steam rendered; as a consequence, the tincture is decomposed, and the benzoin is thoroughly mixed. The following mode of benzoating all kinds of animal fats will be found the most effectual for preserving them for a long time: Make a saturated solution of gum benzoin in alcohol by simple heat, allow the liquid to settle clear, then strain and mix with equal parts of fresh castor oil. Of this mixture add four ounces to each gallon of fat or ointment while warm. The proportion of the solution of benzoin may be increased for pomades, as it firms, by its aromatic odor, an excellent basis for perfumes. The benzoic fat should be kept not in tins, but in jars well covered. Steam-rendered lard, or that treated with salt and alum, should be carefully remelted in water bath to allow all the water to settle, so as to pour off the pure fat.

Thermometers, and how they are Made.

"Warm" and "cold" are merely comparative terms; a thing may properly be called "warm" under some circumstances, which under others would be regarded as cold. Weather which in winter would be regarded as warm would in spring be considered cold; and, if we depended upon our sensations alone, it would be impossible for us to state correctly the real facts in such cases. Indeed, our senses are exceedingly apt to deceive us, as is shown by the common experiment of putting one hand in cold water and the other in that which is hot, and after a short time placing both in the same vessel, which should be filled with tepid water. The hand that was in the cold water will now feel warm, and the hand that was in the warm water will feel cold; showing that under some circumstances our senses are anything but trustworthy guides. And yet it is only within comparatively recent times that methods have been devised whereby measures of temperature can be referred to fixed standards. It was an ingenious, though, of course, an obvious suggestion, to employ for this purpose the relative amounts of expansion produced by different degrees of heat; but it required great skill and profound thought to mature a plan whereby the observations of different investigators could be compared with each other, so as to preserve a record of the actual temperature existing at any given time. The earliest instruments used for indicating changes of temperature were not thermometers, but mere *thermoscopes*, or instruments for indicating such changes without measuring them accurately or affording data for recording them. Such were the instruments of Amontons and Sanctorius, which consisted of a glass tube, at the end of which was a bulb filled with air. The tube was partly filled with colored liquid, and, as the air expanded and contracted in the bulb, the liquid moved in the tube. It will be easily seen, however, that such an instrument would not be affected by heat only: As the atmospheric pressure varied, the air in the bulb would be enlarged and expanded, just as it would be by variations in temperature, and thus we should be liable to attribute its rise and fall to the wrong cause. It was not, therefore, until about one hundred and seventy-five years ago, when Fahrenheit suggested the use of mercury, that a really reliable thermometer was produced.

The principle upon which the mercurial thermometer depends for its action is, that mercury expands in a faster ratio than a glass bulb containing it: and, consequently, if we have a bulb with a fine tube attached, and fill the bulb with mercury at a temperature equal to the freezing point of water, if the mercury be heated to the boiling-point of water it will expand so much more than the glass bulb, that one sixty-third part of it will be forced into the tube. The process by which thermometers are made is as follows: The workman takes a quantity of glass tubing with a very fine bore—the tube being generally flat, so that it may show a broader band or ribbon of mercury than if it were round; and in order to still further increase the ease of seeing it, the tube is frequently made with a band of colored glass behind the hole or bore; the thread of mercury of course shows very distinctly against the colored glass. This tubing is cut up into pieces of lengths suitable for making six-inch, ten-inch, or twelve-inch thermometers. The next step is to blow the bulbs on the ends of these pieces of tube. Now, it will be readily seen that, as mercury expands a certain definite proportion of its bulk when heated between 32° and 212° (one sixty-third as just stated), the size of the bulbs must be accurately proportioned to the bore and length of the tube, or the thermometer would not be good for any-

thing. Thus, if there were blown on a tube six inches long a bulb so large that one five-hundredth of its contents would fill the tube, the thermometer made from it could not be made to show a range of over 25°. To get the bulb proportioned to the tubes is therefore an indispensable operation. To accomplish it, the tubes are first assorted into different sizes, the workman examining them by means of a lens or microscope. After this the bulbs are blown to certain gauges, and in this way is secured a degree of accuracy which is sufficient for most practical purposes. The process of blowing the bulbs is a very simple one, but it is necessary to take great care that no moisture or dirt should get into the tube. To guard against any accident of this kind, the following plan is adopted: A small india-rubber bag is attached to one end of the tube, and the other end is melted and rendered quite soft by means of a lamp and blow-pipe. A very slight pressure on the bag forces through the tube an amount of air sufficient to expand the semi-liquid glass into a hollow bulb, the size of which is regulated by the gauges formerly mentioned. The next step is to fill the bulb and tube with mercury. At first sight, it would seem to be a very difficult problem to pour the mercury through such a fine tube; but by the following device the operation is easily performed: A strip of writing paper is rolled round the open end of the tube, and firmly tied so as to form a sort of tubular funnel. This funnel is then filled with well-boiled mercury, and the glass bulb is warmed so as to expel some of the air that it contains. As soon as it cools, the air within it contracts, and the pressure of the outer air forces some of the mercury into the bulb. This mercury is now caused to boil vigorously, so that its vapor shall expel all the air; and when this has taken place the whole is allowed to cool. Of course, as soon as the vapor of mercury which fills the bulb has condensed, a vacuum will exist in the bulb, and the mercury in the funnel will be forced in so as to completely fill it. The paper funnel is now removed, and the end of the tube drawn out to a fine point, so that it may be readily closed by the blow-pipe while full of mercury, as in this way alone can it be sealed and the air excluded. The next step is to adjust the quantity of mercury contained in the tube so that the end of the column will fall in the right place; after which, the thermometer must be properly graduated.—*The Technician*.

Tests for White Lead.

The *body*, or covering power of paint is due to two causes—a great division of the substance, which allows it to be spread over a large surface; and opacity, which allows a thin coat to impart the desired color. It is evident that a transparent substance, however equally divided, will not sufficiently color the surface over which it is spread; and, on the other hand, an opaque color, if coarsely divided, will not cover a large area.

White lead, if formed purely of carbonate of lead, will not have sufficient covering power. The Dutch method is due to a certain proportion of hydrated oxide of lead, mixed with the carbonate; and we may say that the more there is of hydrated oxide in the white lead the more body it will have.

If several samples of pure white lead are submitted to a chemical analysis, those containing the greatest proportion of oxide of lead, with a minimum of carbonic acid, will be found to have the greater covering power.

Our object is to introduce a rapid process by which persons not conversant with chemical manipulations may ascertain the relative body of samples of white lead not ground in oil. This test is based on the phenomenon presented

by yellow chromate of lead, when a part of its chromic acid is removed, or in other words, when it is made to contain an excess of oxide of lead; the yellow turns to an orange shade, which is the deeper as there is more oxide of lead uncombined with the chromic acid.

Therefore, if we put same weights of different samples of dry white lead in several saucers, and pour into them the same volume of a solution of potassa, a reaction will take place by which the chromic acid of the chromate of potassa will unite with the lead of the carbonate of lead, forming a chromate of lead, which will be of a deeper orange shade as there is more free oxide of lead in the samples examined.

The solution of chromate of lead should be added in excess, that is to say, should, after stirring it with the white lead in the saucer, and allowing it to stand for a few minutes, be still of a yellow color. The samples are examined after settling and decantation of supernatant liquor.

As yellow chromate of potassa is generally alkaline, it is better to correct this alkalinity by employing a mixture of 13 parts of yellow chromate of potassa and 2 parts of bichromate of potassa, dissolved in 10 parts of water to 1 of dry salts.

If the dry white lead is adulterated with foreign substances, the orange color will not be so deep in color.

This test does not apply to paints already ground in oil, in which case it is preferable to mix the weighed sample with $\frac{1}{2}$ to 1 per cent. of lampblack, and a few more drops of oil if necessary. After thoroughly mixing lampblack and white lead with a painter's knife, upon a porcelain slab or a pane of glass, the samples are compared, and the lighter the drab shade is the greater the coloring power of the paint examined.

VIBRATING MOVEMENT OF MATTER.—The following illustration, says Professor Henry, of the vibratory movement of matter is attested by Professor Horsford, of the United States. The top of the high tower which constitutes the Bunker-hill monument inclines towards the west in the morning and the north at mid-day, and towards the east in the afternoon. These movements are due to the expanding influence of the sun as it warms, in succession, the different sides of the structure. A similar but more marked effect is produced on the dome of the Capitol of Washington, as indicated by the apparent motion of the bob of a long plumb line fastened to the under side of the roof of the rotunda and extending to the pavement beneath. This bob describes daily an ellipsoidal curve, of which the longest diameter is 4 in. or 5 in. in length. By molecular actions of this kind, Time, the slow but sure destroyer, levels with the ground the loftiest monuments of human pride.

REGENERATION OF WASTE SILVER SOLUTIONS.—Dr. Grager states that the best plan to treat these solutions is the following:—"The solutions are boiled either in a porcelain basin or glass flask, and while boiling there is added to them recently precipitated, well washed, and moist oxide of silver, the boiling being continued for some time. The liquid is next filtered, and then evaporated to dryness, the heat being increased to fusion, so as to destroy ammoniacal salts; the residue is pure nitrate of silver. The sediment in the filter contains some oxide of silver, which must be added in excess; and, therefore, in order not to lose that, the filter is preserved, and the contents worked up at a subsequent operation. The nitrate of silver thus obtained is, by practical photographers, pronounced to be of excellent quality."

Paint and Painting.

Paint, as is well known, is made of various mineral productions, which are reduced to powder, and then made liquid by some fluid so as to admit of application with a brush. The coloring substance is sometimes ground in water, and then a size must be added to give it a stronger adhesive power; sometimes it is mixed with spirits of wine, and, as this fluid evaporates readily, only a small quantity must be mixed at a time; but it is commonly ground in oil, and mixed with turpentine or "turps," as it is called by workmen, a substance obtained from larch or fir trees. Ceilings and stringing of staircases are frequently painted in water colors; but wood-work and the walls of rooms are commonly painted in oil colors. In that kind of finishing called "flattening," because it makes a very even and dull surface, the color is prepared with turpentine only; and as the execution of the work is very readily detected when it is "flattened" great care should be taken in the process, and a clever, expert workman should be employed.

A very superior material for the whitening of internal walls may be made in the following manner:—Take a quantity of very fine lime, and, passing through the finest sieve that can be obtained, place it in a vessel sufficiently large for the purpose, and, filling it with water, thoroughly mix the lime and water with a wooden instrument, so as to diffuse the whole of the solid material through the fluid. When this has been done, let the mixture stand for about twenty-four hours, so that the lime may be deposited, and then draw off the liquid, which will contain the impurities previously mixed with the lime. Fill the vessel again with water and mix the ingredients as before, and draw off the water when the sediment has been formed. The lime will then remain at the bottom of the vessel, and the impurities being withdrawn, it will be exceedingly white; so bright, indeed, that it will be necessary to add a little Prussian blue. When the purified lime is mixed with turpentine, size, and a very small quantity of alum, a composition will be formed, which, when applied to the surface of the work, will have a peculiarly beautiful appearance. The work will be greatly improved by rubbing it with a brush, not so stiff as to scratch it, but sufficiently so to produce a strong friction.

Great care is required in painting upon stucco, for the work must be not only thoroughly dry, but free from any liability to dampness; that is to say, the walls themselves must be dry. It is, consequently, usual to allow the stucco to remain for several months before it is painted; and this is especially necessary when it covers over a large surface, as in the walls of churches, chapels, and theaters. If the paint be applied too soon, the work will have a blotched appearance, and be probably filled with small vesicles, formed during the evaporation of the water. When the work is dry it may be prepared by covering it with a coat of linseed oil boiled with driers. This must be laid on very carefully or the face will be irregular. The color may then be applied, and four coats will not be too much, the work being new. Persons are generally so anxious to have their buildings finished, that they disregard the future appearance of the work, and within a few weeks after the application of the stucco cover it with paint. But it would in all cases be sufficient to wash the surface with distemper, as it would give a finished appearance to the building, and make it less necessary to hurry the work. But when the work is sufficiently dry to receive the oil color, the water color, that is to say the distemper, should be removed, which may be done by washing; and, as the water does not penetrate into the substance of the stucco, it will dry in a few days

and receive the oil color. The tints may be regulated by mingling different colors, as in all kinds of painting.—*American Builder.*

CONSUMPTION OF SMOKE.—The following simple mode of building a fire, either in an open grate or in a furnace, will not only consume all the smoke, soot, and gas of our common hituminous coal, and prevent the accumulation of soot in the chimney or pipe, but by the combination of hard and soft coal is both economical and convenient. In an open grate, first place a small wad or ball of paper, or fine shavings; then upon and around this a few short pieces of kindling wood loosely crossing each other to receive the soft bituminous coal; cover the wood with soft coal, the quantity to be determined by the size of the fire required, and light the paper. As the soft coal begins to burn, cover it with a quantity of fine nut Lehigh or anthracite coal an inch thick. If the draught is small, or you wish to hasten the fire, apply a common sheetiron blower, till the hard coal becomes red. The fire need not now be touched again for twelve hours, unless to apply the blower to increase the heat. When necessary to replenish the fire, add soft coal and cover as before; and, after the coal is kindled, shake out the ashes below.

By this combination of soft and hard coal in constructing your fire, you will secure, first, a consumption of all the smoke of the soft coal, which must pass through the red hot hard coal, and will scarcely discolor the grate, chimney, or pipe. Second, it will make a steady and hot fire; and though the fire in the grate is small, and the coal placed in a conical shape, in mild weather not fitting the grate or furnace, it will burn steadily and not go out till the coal is consumed. The soft coal, which burns rapidly with flame and smoke, will, when thus covered with fine hard coal, consume gradually without smoke and with little flame; and as it burns, the hard coal is kept hot, and settles around it. Third, it is also economical, because all the coal is burned and you can control your fire to suit the weather. In very cold weather, if you construct your fire of soft coal alone, it must burn out very rapidly; and the larger the fire the more rapidly it consumes, and must be constantly replenished. In mild weather, if the fire is small, it will soon go out or fill the chimney with smoke and soot. If you burn hard coal exclusively you must keep up a large fire and have a strong draught, or, if the fire is small, it will go out.

The writer has used the Missouri and Illinois coal—combined with anthracite coal as above described, both in open grates and furnaces—the past two winters, with the most satisfactory results, as stated.—*Technologist.*

THE THEORY OF THE BUNSEN FLAME.—Frankland's investigations throw some doubt upon the commonly accepted theory that the luminosity of flame is solely due to incandescent carbon, and that the non-luminosity of the flame of the Bunsen burner is caused by the perfect combustion of the coal-gas, the particles of carbon being burned up at once instead of remaining for a moment in a white-hot state before the oxygen can get at them. Some recent experiments by Herr Knapp appear to prove that this latter explanation can not be the correct one. He finds that if instead of allowing air to mix with the coal-gas in the Bunsen burner, a sufficiently strong stream of nitrogen, hydrochloric acid, or carbonic acid gas, no one of which can act as a supporter of combustion, be passed into the flame, the latter becomes perfectly non-luminous. Probably this is in great part due, says the *Boston Journal of Chemistry*, to the reduction of temperature and pressure in the flame, consequent on the introduction of the above gases.

RAILROAD NOTICE.**The Cincinnati & Great Northern Railroad Company.**

The undersigned Corporators of the Cincinnati & Great Northern Railroad Company hereby give notice that more than ten per centum of the capital stock authorized by the Articles of Association of said Company has been subscribed, to-wit, eight thousand eight hundred and twenty (\$8,820) shares; the said Corporators therefore give notice for the said stockholders to meet at the office of the Railroad Record, No. 167 Walnut street, Cincinnati, Ohio, on Saturday, the 30th day of September, A. D. 1871, at 11 o'clock A. M. of said day, for the purpose of choosing seven directors of said Company. A full attendance is requested.

A. J. HODDER,
DURBIN WARD,
T. WRIGHTSON,
S. W. MORTON,
ROBT. HEDGER,
Corporators.

CINCINNATI, O., Aug. 30, 1871.

31-8-71, 4.

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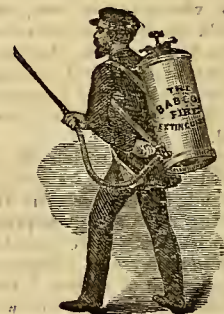
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AGAINST FIRE.



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F. W. FARWELL, Secretary,

122 Washington Street,

CHICAGO.

H. J. BOND, Gen'l Agent,

22 West Fourth Street,

CINCINNATI.

The Railroad Record.

E. D. MANSFIELD, - - - - - } Editors
T. WRIGHTSON, - - - - - }
A. J. HODDER, - - - - - }

CINCINNATI, THURSDAY, SEPTEMBER 21, 1871.

The Railroad Record,

PUBLISHED EVERY THURSDAY MORNING,

By Wrightson & Co.,

OFFICE—No. 167 Walnut Street

SUBSCRIPTIONS—\$3 per annum in advance.

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The Railroad Progress of the Country, in Reference to the Increase of Income.

The increase of the wealth of a country does not depend on how much money there is, or how much interest it bears; for they might be increased indefinitely, and the country be not a particle richer. For example, suppose certain banks had a hundred millions more money, and that bore 10 per cent. interest. Apparently there would be \$10,000,000 added to the income of the country; in fact, there would be none at all. Certain individuals, as A and B, may enjoy a greater income, but certain others, X and Y, would have so much less, because they have paid it in interest. Nothing has been done but to increase the medium of exchange, and a part of the community pay interest on it; but nothing has been added to the production, or the value of productions in the country. That can only be done by the application of labor to the production of useable materials. That only adds to wealth. This is now a recognized principle of political economy. Whatever supports or comforts or supplies the wants of men in any way, is wealth; and whatever application of labor creates these useable materials increases wealth. Money is in a small and inferior sense wealth, because it is an instrument of exchange; but instruments must be regarded as very far inferior to the material which they are used to work upon.

Looking now to the real functions of a railroad, we perceive that it has three distinct functions: First. It performs the function of

exchange, just as money does. It enables two sections of the country to exchange each other's products, just as money does. The main difference is, that a railroad does work too heavy for individuals to do. The value of a barrel of flour may be exchanged with a piece of paper money. But the barrel of flour itself can not be actually exchanged in that way. It must be taken up and carried. That money can not do. Second. Another function is to apply labor to production. This it does when the railroad is made in the first instance, and then in every new locomotive and car made. Then it utilizes labor in production, and thus to utilize labor is its second function. Third. Its third and perhaps greatest function is to produce wealth by enabling others to produce. This it does by making distant productions marketable; for, unless they were marketable, they would not be produced. In the great central region of the United States no surplus grain above the actual consumption of the country would be raised, unless there were railroads. We do not mean to say there would not be a great deal carried off, as there was, by the Ohio and the lakes; but we do mean to say, that in a large part of the country, where wagoning alone was the means of transportation, very little could be carried to distant markets, and very little could have been raised. We estimate that the great trunk lines carry to the Atlantic markets 3,000,000 tons of Western produce, which is worth \$400,000,000. Without the railroads, three-fourths of that would never have been produced. We presume our estimate is too low, but we are not estimating the whole tonnage of produce, but of that which comes from the central region.

In estimating the income brought into the country by railroads, it is evident that dividends to stockholders make but a small part of it; and that, in estimating the income of railroads, dividends are no test; but the dividends and interest on bonds do show the income available to the increase of money or active capital. For at present, this is a very important inquiry. A great change has come over the country, since the war, in regard to active capital. We have, first, an immense mass of bonds in circulation, which were not before the war; then we have a rapid increase of insurance and other personal stocks; and then we have an immense mass of railroad stocks and bonds. In looking to the actual increase of active capital from this source, we think it safe to say that half the dividends on railroad stocks and bonds are reinvested in other stocks and bonds. We say this, because a very large part of all stocks and bonds are held by wealthy men, who reinvest a large part of their income.

Let us now look into the income of railroads from the actual experience of railroads in this country. In Mr. Poor's *Manual of Railroads*, a most valuable and interesting work, we have

the returns of all the railroads in the country, and we can at once, see what the cash or paid income of railroads, independent of income to the country, is from this source. In round numbers it is as follows:

Cost of railroads.....	\$2,100,000,000
Gross receipts.....	400,000,000
Gross cost of operating.....	240,000,000
Net profits.....	160,000,000
Rate per cent.....	7½ per cent.

This is certainly a very extraordinary result, when we consider how many ill planned and extravagantly made roads there are. It is also shown that the business of railroads increases at the rate of 7 per cent. per annum. Let us see how this will work in ten years. Let us take an average railroad, whose capital is \$10,000,000. Then the income now will be as follows:

Cost.....	\$10,000,000
Gross earnings.....	1,875,000
Gross expenses.....	1,125,000
Net profits.....	750,000
	7½ per cent.

Now, under the increase of 7 per cent. per annum of business, the results are in 1881:

Cost.....	\$10,000,000
Gross earnings.....	3,187,500
Gross expenses.....	1,912,500
Net profits.....	1,275,000
	12½ per cent.

We see here what an astonishing effect is produced by this increase of business. This is because the road once being thoroughly made, the capital will remain fixed, all the new rails, ties, and other repairs being included in the operating expenses. So, also, the ratio of operating expenses is fixed; indeed, they ought to diminish as the road becomes solid, and economy is increased by experience. So, if the capital is fixed, and the ratio of expense is fixed, it is plain that the ratio of profits must rapidly increase. So, in the above case an average road rises in ten years from 7½ to 12½ per cent. This will continue so long as the population and production of the country increases.

But we are now speaking of the increase of the income of railroads, and the additions made to the wealth of the country. In the above general tables we find that the cash profits earned by railroads amounted to \$160,000,000 per annum. Half that is reinvested in stocks and bonds. This is \$80,000,000. This, reinvested, makes 2,000 miles of railroad. But the income furnished by railroads can not be estimated in this way only. There are over \$300,000,000 furnished by railroad transportation to the wealth of the central region which could not exist without them. This is paid to corn factors, cattle and pork dealers, and contractors, and, as they increase in wealth, new roads are made, and at least \$50,000,000 reinvested from this source. So, large sums of foreign capital are attracted by the success of railroads here. We may add

at least \$50,000,000 more from this source. Altogether, we believe, at this time, not less than \$200,000,000 per annum are drawn by railroads to reinvestment in the same species of property. This will make 5,000 miles of railroad per annum; last year 6,000 miles actually made. So that we see that railroads themselves furnish a large part of the means for future constructions. Hence, as a general conclusion, we think that railroad construction will go on, and go on profitably for many years.

Railroad Property; Its Increasing Value.

The best criterion in the world of the value of any property is its productive capacity, its earning power. The railroads of this country have become a great earning power; they have not only developed the country and created new and constantly increasing values in the fixed property of the country, (the landed estate,) and spread out our population, who by the aid of newly invented machinery have cultivated increased areas of territory and made the results of their labors available in the markets of the world at competing prices, but without their aid at least one-half our present agricultural products would have to rot where produced and nearly all the products of our mines would be unavailable. Even in a concentrated country with a dense population and short transits like England, the railroad system has been the great developer of her mineral wealth. Without the railroad system of this country commerce would be confined to the natural and artificial water courses, and population mainly concentrated on them. Railroads, however, have changed all this, and the products of far off fertile plains are brought to the very doors of the consumers, the great centers of population. These avenues of travel have been constructed at a cost of thousands of millions of dollars, and it is but right they should have a large earning power. The following table presents a very gratifying result of the increase of railroad earnings, fully demonstrating the importance and constantly increasing value of railroad investments:

EARNINGS FROM JANUARY 1 TO SEPTEMBER 1.

	1871.	1870.	Inc'ce.	Dec'se.
Central Pacific...	\$5,919,244	\$5,018,281	\$890,963	.....
Chicago & Alton	3,447,610	3,036,811	410,799	.....
Cleve., C. & I.	2,393,551	2,027,354	366,197	.....
Illinois Central...	5,364,056	5,370,034	14,022	.....
Marquette and Cin.	1,006,698	846,941	159,757	.....
Michigan Central	3,633,656	2,905,868	667,788	.....
Milwaukee & St. P.	3,916,979	4,383,676	.....	467,377
Ohio & Miss.	1,944,132	1,947,466	.....	3,334
Pacific of Miss.	2,237,319	2,232,408	14,941	.....
St. L. & Iron M.	1,004,772	853,635	151,137	.....
Toledo, W. & W.	3,530,227	2,644,016	886,211	.....
Union Pacific.....	2,687,032	5,105,024	.....	417,973
Total.....	\$39,094,626	\$36,415,494	\$3,667,135	\$888,683

NORTHERN PACIFIC RAILROAD.—We observe by an advertisement in the Oregon *Sentinel* that the Northern Pacific Railroad are advertising for two hundred choppers and loggers to do clearing on the western end of the line.

SUPERINTENDENT OF ATLANTIC & GT. WESTERN RAILWAY.—The Trustees of the Atlantic & Great Western Railway have exercised most unusual discretion and good practical common sense in their selection of the principal officers in the new management of this road. They have adopted the good Napoleonic maxim of promotion from the ranks, as a reward of merit. This is eminently true in the case of O. S. LYFORD, Esq., the General Superintendent and Manager of the line, who was "horn and brought up" on the road. Mr. L. was for three or four years division superintendent of the first and second divisions, under the old administration of the A. & G. W. When the Erie regime was established, Mr. Lyford was appointed the Assistant General Superintendent of the Erie Railway, in charge of the Atlantic & Great Western Division; and we need but refer to the general traveling public for testimony as to the condition and management of this portion of the great Erie line of railways, to obtain ample evidence of the skill and executive ability of the appointee. It is evident to our minds that the Trustees have had but one object in view in selecting their agents, the interest of the road and accommodation of the public.

Cincinnati & Great Northern Railroad.

The people of the western tier of counties in Ohio have for a long time desired the construction of a line of railroad that would furnish them an outlet to the markets of the world. This would have been realized ten years ago if energy and inadequate financial means could have accomplished it. Although of great service in all new enterprises, skill, energy, perseverance, and indomitable pluck, alone will not procure rails and spike them to the cross-ties and complete and equip a railroad. It requires something more—it takes money, and in the great financial struggles that occurred during and at the close of the war it was not always possible to obtain all that was required to carry on the work. Hence, it had to be stopped, and by the grasping greed of a few inconsiderate parties, the interest of the many was destroyed, and the property sacrificed and sold.

Of this old enterprise our associate, Mr. A. J. Hodder, was the president, and although many persons were made to suffer by the failure of the scheme, yet financially no one suffered one-tenth as much as he did; he sunk a portion of his fortune and many of the best years of his life. Yet so strong was his faith in the merits of the enterprise that he has never ceased his efforts or his hopes of constructing this road, and it is to his exertions that the people of the western tier are indebted for the present hopeful condition of this work. The following tribute from the *Celina Standard* is no more than merited, and although it certainly must be agreeable to him,

it is but a faint reward for his many years of toil and labor:

"Upon the completion of this great thoroughfare our people will realize all that has been promised them, and more; real estate will be greatly increased in value, the teeming products of our fertile soil will not only find a more ready market, but will command better prices by reason of the increased facilities for transportation and the competition invited hither by the improvement. We have been, and will continue to be shut out, as it were, from the great hustling business world until this road is completed, but when that period arrives, as it certainly will in a very few months, it will mark an epoch in our history—our people will take a 'new departure' and go forward in a career of unprecedented happiness and material prosperity.

"But while we are congratulating ourselves upon the prospect and are buoyant with hopes for the future, we ought not to forget the men who have contributed so largely toward bringing about the glorious result. To A. J. Hodder, more than any other one man, are we indebted for the prospect of a road. We know whereof we speak when we say there has not been a day since he severed his connection with the old Mackinaw project that he has not been laboring to induce some party to take hold and complete it; and it was through his influence and upon his solicitation that Morton and his associates were finally induced to take an interest in the project and make the proposition they have. For a time Mr. Hodder was under a cloud in our community by reason of his connection with the old Mackinaw troubles and complications, and he was blamed by many as being the cause of all their troubles and pecuniary losses in that scheme, but it is our opinion, and we believe we but express the sentiments of our people when we say, in all that matter he was a great deal more sinned against than sinning."

"Honor to whom honor is due."

We have received, (we suppose, in common with every other publication in the United States) a series of tracts, written, or godfathered, by Theodore Tilton. The avowed object of these tracts is to make Mrs. Victoria Woodhull Blood the President of the United States. We confess to not having read the documents; but from a cursory glance at their contents, deem them too ethereal or spiritual for such sublunary journals as the *RAILROAD RECORD*, which is supposed to deal mainly with hard facts and figures relating to the commonplace matters of railroads, lawful commerce and transportation, rather than the private quarrels, ambition and amours of a handful of free and easy livers. We therefore leave all criticisms of personal history, past, present or future, to those journals whose time and tastes lead them into the discussion of kindred subjects, while we devote ourselves to our specialty of making the pathway of all smooth and transit easy through this world, and allow them to "bring up" in the other wherever their destiny or fate may eventually land them. In the meantime, as far as we are concerned, all may entertain their own opinions, hopes and fears.

Kentucky & Great Eastern Railroad.**Proposition of the Directory—Decision of the Court.****THE PROPOSITION.**

At a meeting of the President and Directors of the Kentucky & Great Eastern Railroad Company, held in the city of Maysville, Kentucky, on the 24th day of August, 1871, the following resolution was adopted, viz:

Resolved, That the County Court of Mason county, be, is hereby requested to submit to a vote of the qualified voters of said county, in the manner prescribed by the Act, entitled an Act to incorporate the Kentucky & Great Eastern Railway Company, approved March 21st, 1870, the question whether said County Court shall subscribe for, and on behalf of said county, \$400,000 to the capital stock of the said company, on the following terms and conditions, viz:

Said subscription to the capital stock of said company to be paid in the coupon bonds of said county, of the denomination of \$1,000 each, or of any smaller sum, not less than \$100 each, at the option of said company, payable in not less than five, nor more than twenty years, from date, at the option of the said county, in the city of New York, and bearing seven per cent. interest, payable semi-annually in gold, in the city of New York; the proceeds of said bonds to be expended in bringing into use the said road from the western line of said county to the Big Sandy river, the whole line extending from Newport, through Campbell, Pendleton, Bracken, Mason, Lewis, Greenup and Boyd counties, and Maysville being a point. Said bonds to be delivered to said company only in installments upon the construction and completion, ready for the cars, for each ten miles of said road, and the report of the fact to the County Court of said county, by the chief engineer of said company and a commissioner appointed by the County Court, and in case of their difference, by their umpire; the said installments being *pro rata*, and as the length of ten miles is to the whole length of the road from said western line of said county, to said Big Sandy river; the said bonds to be delivered to said company with all coupons not due at date of the delivery. The said company hereby agreeing to receive the tax receipts issued to each and every taxpayer, to pay the interest on said bonds, at par, for railway service on said road, after two years from the date of the first delivery of bonds, to be in lieu of dividends on said county's stock; the said company also agreeing to receive at par, for railway service, the whole of said county's stock in the road, in the hands of said county or its assigns, after the lapse of five years from the date of the first delivery of bonds. The preference hereby proposed to be given to the stock of said county, and the receipts of its taxpayers, shall be strictly limited to such counties and cities and their taxpayers, as may subscribe to the capital stock of said company, thus constituting such subscriptions a preferred stock. The said railway company, however, agreeing to receive the tax receipts in stock subscribed by the county of Mason, and the stock subscribed by the citizens of Maysville, in the Maysville & Lexington Railroad Company (Northern Division), for railway service, at par, or to issue stock therefor in the Kentucky & Great Eastern Railway Company, at the option of the holder, provided a lease of said Maysville & Lexington Railway, N. D.,

or consolidation of both roads can be effected. But the subscriptions to the capital stock of the Kentucky & Great Eastern Railway Company, by the county of Mason and the other counties and cities interested, shall have the preference, when made, over stock taken in pursuance of the above contemplated arrangement. The said company also binding and obliging itself not to mortgage the road from Covington to the Big Sandy river, for a larger sum than fifteen thousand dollars per mile; further agreeing to locate and build its work shops, machine shops, etc., at a point between Cabin creek above and Blue run below Maysville, as said city may direct. Conditioned upon the donation to said company of suitable grounds for said buildings. All of which terms and conditions shall form a part of the contract of subscription when made by the County Court of said county.

S. W. Morton, A. J. Hodder and John M. Duke, Sr., being now also appointed an Executive Committee to present this, or any other proposition for a vote of said county, or any number of its precincts less than the whole, which they, in their discretion, may deem proper.

Attest. S. W. MORTON,
Pres't Ky. & Gt E. Railway Co.

The above proposition was presented to the full bench of magistrates, on Thursday, Sept. 14th, by his honor Judge Sumrall, twenty of the twenty-two magistrates being present, and the proposition agreed to be submitted to the vote of the qualified voters of the county without a dissenting voice. This was after a very full canvass of the subject. This speaks volumes for the fairness of the proposition of the company and the vast importance of the enterprise to the material interests of the State of Kentucky. We have no doubt that the intelligent yeomanry of Mason will fully comprehend and appreciate this enterprise that will relieve them from the terrible incubus that has rested on them for so many years, of being close by, but shut out from, the great commercial intercourse of the world.

The time for the election is fixed for Saturday, October 7th.

— The narrow gauge locomotives, built by the Baldwin Locomotive Works for the Denver & Rio Grande Railway, have been set up and tried on the line of that road near Denver, and are now in operation in the construction of the road. About three and one-half miles of narrow gauge track (three feet) had been laid out of Denver at last accounts, and upon this the small engines have been thoroughly tested. Immediately upon leaving Denver the track is laid to a temporary grade of one hundred and forty feet to the mile. Up this grade the freight locomotive pulled twenty of their four wheeled flat cars loaded with railroad iron. The engine hauled this train without difficulty, stopping and starting readily with it on the grade. This engine has three pairs of drivers, 36 inches in diameter, a pony truck in front, and weighs, in running order, 34,000 pounds. The passenger engine, Montezuma (with two pairs of drivers and pony truck, weight 25,000 pounds), drew a train of six passenger cars, at a speed of thirty miles an hour, making the time with ease. The engines ride well and steam freely.

The Kentucky & Great Eastern Railroad.**AN ENTERPRISE OF IMPORTANCE TO LOUISVILLE.**

This enterprise, which is now assuming a practical shape, is one of some interest to the people of Louisville, as well as those of the South-western interior States. In its more comprehensive purpose, it contemplates a new line of railway, by consolidation and otherwise, from Louisville, Cincinnati, St. Louis, and Memphis, through a region of the most fertile and full of natural resources, to the city of New York and other cities on the Atlantic seaboard. * * * *

The road will pass through a region of unsurpassed agricultural country, now under a high state of improvement, and also through the very heart of the rich mineral sections of North-eastern Kentucky. It will open up to our enterprising men of Louisville the vast cannel and bituminous coal deposits, and the mineral, salt, and oil springs of the Kanawha region of West Virginia, the extensive gas-bearing coal fields of the upper Monongahela, and the rich and densely populated section of South-eastern Pennsylvania. It passes through the localities of the finest timber upon the continent for plow and carriage and work, and gives easy access to the slate, lime, marble, and sandstone quarries which abound upon the line of the road, the products of which are in such constant and increasing demand, both in the Eastern and Western cities.

The company which has been organized for the construction of this important through route to the Atlantic cities, are, most of them, men of wealth and great railroad experience. They seem to be pushing the enterprise with some energy, and will soon submit to the people of the several counties along the line of the road in Kentucky, from Maysville to Catlettsburg, propositions for a moderate local subscription in county bonds, bearing interest at seven per cent., to be paid semi-annually in gold. They are prepared to propose to the county of Mason, that if her people will vote a subscription of \$400,000 in bonds, the company will immediately commence the construction of the road, beginning at Maysville, and not require the delivery of any of the bonds until ten miles of the road shall have been fully completed, when one-tenth of the bonds will be deliverable, and so on with successive ten miles of completed road, until the whole amount of the bonds are consumed.

The proposition meets with great favor from the people of Mason county, and it is the opinion of many of the best citizens that the vote will result overwhelmingly in favor of the subscription. It is understood that the company, to meet their part of the obligation imposed by this subscription of stock, have at command, in available means, and as a construction fund, two millions of dollars. As soon as the vote is taken the work of construction will be commenced. Between Maysville and Portsmouth on the river, two or three hundred thousand dollars were expended by the old Maysville & Big Sandy company, and the masonry and grading then completed are now in a good state of preservation, and will be transferred to the new company under a contract already entered into between it and the owners of the old road.

Louisville has a great interest in all the avenues of commerce leading to her doors. This may turn out to be an important one. If the reasonable expectations of the friends of

this new enterprise are realized, and the work commences as early as above indicated, it will behoove our citizens to give some attention to the measures on foot for shortening the lines between this city and Maysville.—*Louisville Ledger.*

Kentucky & Great Eastern Railroad.

Such is a brief sketch of the Kentucky and Great Eastern Railroad and its prospects at the present time. Cincinnati exhibits considerable interest in this project. It is natural that she should. By it she acquires another and shorter line of communication with the East without paying anything for it. The practical question with us is, does it offer to Louisville and to this section of the State an opportunity which we may use for our material advantage?

Aside from the fact that the ultimate idea of the enterprise is the construction of one great link in the main stem of the Southern Pacific Railroad, and with it a little energy and pluck will enable us to make Louisville one of the objective points of the grand trans-continental line, we think that there is a measure of local interest involved in the matter—of immediate and direct benefits to be derived from it—which merits the consideration of our business men. A glance at the map will show that Louisville, Paris and Maysville lie almost in a straight line. The completion of the Maysville and Paris Railroad is but a few months distant; and with the building of the Kentucky and Great Eastern road the line of road will be extended to Catlettsburg, and thence to New York, or by the Chesapeake and Ohio to Norfolk, thus opening up the entire Eastern seaboard, and by branches and connections reaching to every important Eastern city. The immense amount of traffic and travel that will pass over this route will come by Cincinnati; the overflowing of the cornucopia will drop into Cincinnati's lap; for at that point the connections will be made complete, and the interests of the lines that center there, exchanging business, will induce them to make common cause in giving that direction to the carrying trade. But Louisville lies in a better position to receive this benefit than Cincinnati—in fact, she occupies a position where she can command it if she choose to do so. A short line of railroad from Frankfort or thereabouts through Scott county to Paris will do the work as completely as if we were to build an independent railroad from here to Maysville. It would connect us at Paris with the Maysville road, at Maysville with the Kentucky and Great Eastern road; and at Catlettsburg with the latter and the Chesapeake and Ohio, two great trunk lines whose branches penetrate every part of the East and tap the commerce of the world at the great marts on the seaside, where the pulse of trade beats highest, would contribute directly, without passing through the toll-gate of a rival city, to our business, our growth, our wealth and our general prosperity.

It would also let us into direct communication with the lumber and mineral regions of Eastern Kentucky and Western Virginia, opening up the vast natural wealth of a comparatively undeveloped section, and bringing it within easy reach of us—the lumber and iron for our manufacturers and builders, and the coal for all, from the foundry which consumes it in a hundred blazing furnaces to the humble grate in the garret which is gladdened with a few bushels during the biting frosts of

winter. The coal and iron fields of the eastern end of the State would thus be brought into our suburbs as it were, and made to contribute to the industry upon which all cities feed and fatten. Wherever a new field is opened it is the true policy of a city to stretch out the hand of enterprise and reap the harvest it offers; not to sit idly by and expect others to gather the grain and come and empty it into her lap. The construction of the Kentucky and Great Eastern road into the mineral section will afford us an opportunity which it would be sheer folly to neglect.

Incidental to this subject we may mention that when, by the Frankfort and Paris railroad, we reach the latter place, we shall be in a position, if the Lexington and Big Sandy road is ever built—as we believe it is certain to be some day—to stretch our line a little from Paris to Owingsville, and tap the Big Sandy road at that point, thus sending two industrious arms to delve in the mountains for their hidden wealth, and to mow their magnificent forests, and securing competing lines that would cheapen our facilities for transporting the fruitage of industry and capital planted in that rich field of enterprise.

But there is another advantage and a most important one for which the construction of the Kentucky and Great Eastern road will afford us an opportunity. "We intend it," says Mr. Hodder, one of the directors, "not only as an arterial road to New York, but a trunk line for the great North-west and South-west, with one arm extending to Memphis, and there connecting with General Fremont's trans-continental line; another out through Walnut Hills, Cincinnati, to the peninsula of Michigan and the straits. We have been up there lately and purchased a line of which I was once President. St. Louis is one objective point, Louisville another; so you see we will have as many if not more feeders than the old trunk lines. That's the line we propose—that's our railroad scheme." Truly a grand conception and practical withal. The people of Western Kentucky have already recognized its feasibility and its probability. The proceedings of the meeting at Columbus, Ky., which we published Monday morning, show that they are alive to the importance of this enterprise. The resolutions are significant of Louisville's duty and interest in the matter. They take it for granted that we will see our advantage and avail ourselves of it. It will indeed be short sighted folly if we let slip the opportunity that will thus be almost forced upon us to make Louisville a prominent and important point on the great Southern route from the Atlantic to the Pacific—from the Empire City to the Golden Gate. It is hardly necessary to dwell in detail upon the great benefits to be derived from occupying such a position in order to impress its importance upon our readers.

Thus the Kentucky and Great Eastern railroad will be our earliest opportunity to take at slight cost and trouble a grand stride towards the empire of the South-west. And corollary to that will come the straightening of our road to Frankfort, making, with the Frankfort and Paris road, almost a bee line to the mouth of the Big Sandy.

These are among the most important and pressing railroad enterprises of the near future, and they are worthy of the serious attention of all who have at heart the best interests of the city and of the State. They are subjects that we present as food for thought, and we hope that they will be well digested.—*Louisville Courier Journal.*

Another Southern Railroad Swallowed up by the Pennsylvania Central Monopoly.

RICHMOND, September 12.

After a long and strenuous contest, in which local prejudices and the strongest opposition had to be overcome, the North Carolina Railroad was leased at a late hour last night to the Richmond & Danville Railroad Company for \$260,000 per annum for thirty years. This road is 223 miles in length, extending from Goldsborough, in the east, to Charlotte, in the western section of the State, by a circuitous route. It is principally owned by the State, its estimated value being \$3,000,000. The portion of it for which the Richmond & Danville Company had use in order to make through connections with the South, is that between Greensboro, the terminus of the Danville road, and Charlotte, 90 miles in length. To obtain this they had to lease the entire road, from Goldsboro to Charlotte. Possession was fully given to them at a few minutes past twelve, midnight, and the North Carolina road will now be operated under the control of Colonel A. S. Buford, president of the Richmond & Danville Railroad. By this operation Colonel Buford has consummated his long-sought design of a continuous line from the Chesapeake bay to Atlanta, Ga., and the Central South by the York River Railroad from West Point, Richmond. The Richmond & Danville road from Richmond to Greensboro, the North Carolina road, from Greensboro to Charlotte, and a new road, now nearly completed, from Charlotte to Atlanta. It is needless to say that all these roads are controlled by the Pennsylvania Central Railroad Company, which has thus secured a monopoly of the travel and freights on two of the great Southern routes, the one stretching from Washington down the Atlantic coast to Wilmington, N. C., and the other from the Chesapeake bay to Atlanta and the Central South.

COST OF MAKING MISSOURI IRON—A writer in the St. Louis *Democrat* states that during the past year the average cost per ton of making iron at Carondelet has been as follows: Two and one-third tons of coal, at \$4.35 per ton; twenty-seven bushels of Connellsville coke, at 18 cents per bushel. This reduced to raw coal would make 3½ tons, at \$4.35 per ton. Iron Mountain ore, one and two-thirds tons, at \$5.50 per ton. To this, add labor, \$4.31, interest \$1.14, expenses \$1.50, limestone 27 cents, and we have a total of \$31.71 as the cost per ton of all pig metal made at Carondelet. This cost of making iron, the writer says, leaves no margin for the capital invested or the very great uncertainties of a blast furnace. It shows that while the labor and interest accounts are small comparatively, the fuel and ore cost more than three-fourths.

COMPARATIVE MORTALITY OF CITIES.—The deaths of the year 1870 in some of the large cities are given in the St. Louis Board of Health report. New York, with a population of 927,430, had 27,175 deaths, or 29.3 to each 1,000; Philadelphia, 657,179, had 16,750 deaths, or 25.5 to each 1,000; St. Louis, 312,963, had 6,670 deaths, or 21.3 to each 1,000; Chicago, numbering 299,370, had 7,342 deaths, or 24.5 to each 1,000; Baltimore, 267,597, had 7,262 deaths, or 27 to each 1,000; Boston, 253,984, had 6,096 deaths, or 24 to each 1,000; San Francisco, 150,361, had 3,351 deaths, or 22.3 to each 1,000.

A Ride on the Narrow Gauge.

[Grace Greenwood's Letter to the New York Times.]

DENVER, Monday, Sept. 4, 1871.

I should have chronicled some time ago an excursion on the Denver & Rio Grande Narrow Gauge Railway. We went out about fifteen miles—as far as the rails were then laid. It was a charming day. We had a pleasant company of citizens and tourists, and all went "merry as a marriage bell," in the old days, when marriages were of some account. On this railway you are struck at once with the reduced proportions of everything—from the locomotive, which seems like a small variety of the "iron horse"—a fiery little mustang—to the windows and lamps in the cars. The cars themselves are bright, pretty, diminutive affairs, cosy and comfortable. It seems like playing at railroading, especially as there is marvelously little noise or motion. Never have I known a train glide along so smoothly and quietly. The little engine "buckled right down to her work," like Chiquita, and made no ado about it, for several miles, when, I grieve to say, she suddenly balked, and had to be "switched." We took another horse, and went on merrily to the end of the road. Here we all alighted, and watched the men laying rails and driving spikes. The remorseless officers of the road insisted on your correspondent paying her way by driving a spike. It was a cruel tax on my "muscular Christianity." The newspaper report said that I "drove the spike home triumphantly." But I really thought it "wouldn't go home till morning."

This narrow gauge road, when finished to El Paso, will be a wonderful route—for pleasure as well as commerce—as it will be almost unrivaled for variety and grandeur of scenery. The mountain views, the pictures of river, and park and plain, between Denver and Colorado city, are especially magnificent.

Foreign Commerce.

The returns of the foreign commerce of the United States for the past fiscal year have been completed, from an advance slip of which, furnished by the Bureau of Statistics, *Thompson's Reporter* makes the following analysis. The figures represent gold values:

	1869-70.	1870-71.
Imports.....	\$462,377,587	\$541,493,774
Exports.....	451,162,417	541,504,172

Of the total trade for the fiscal year ended June 30, 1871, it will be seen that the exports exceeded the imports by \$10,398, while for the fiscal year ending June 30, 1870, the imports exceeded the exports \$11,415,170.

The following shows the relative amounts of the foregoing, which consisted of merchandise and of specie and bullion, respectively:

	1870-71.	Imports.	Domestic Exports.	Foreign Exports.
Merchandise.....	\$519,593,750	\$428,539,017	\$14,401,270	
Specie and bullion	21,900,024	84,505,256	14,133,629	

The value of foreign commodities remaining in the warehouses of the United States June 30, 1871, was \$68,324,855, against \$56,930,841 June 30, 1870.

In consideration of the fact that the imports into the United States during the last fiscal year exceeded those of the preceding year in the sum of \$79,016,187, it is not surprising that the value of foreign goods remaining in bond at the close of the year should have

shown an increase of \$11,394,014. That the country has had the ability to consume over \$520,000,000, in addition to the immense amount of its own products, speaks well for the financial condition of the great mass of consumers.

The comparative amounts of the total trade for the fiscal year June 30, 1871, carried in American and foreign vessels, respectively, were, in mixed values, as follows:

	1869-70.	1870-71.
American vessels.....	\$352,969,401	\$353,304,172
Foreign vessels.....	638,127,488	755,522,645

The Massachusetts Shoemakers.

The following facts will interest those who have been trying ways to benefit workingmen. They seem to show that the co-operative system works well:

The strongest order of workingmen in this country is that of the St. Crispins, in Massachusetts, an association of shoemakers numbering over fifty thousand members, and already making itself felt as a power in the politics of the State. They control eighteen co-operative stores, all of which have been successful. A society was opened at North Bridgewater in June, 1869 with a capital of only \$600. It now has \$2,700 capital stock, and its average weekly sales amount to \$1,600. At the end of the first twelve months, it declared a dividend of eight per cent. on the stock: 7-13 on purchases of shareholders, and ten required by law to be set apart as a sinking fund. Since January of this year, shares have been sold to all laboring men and women who desired to join, and the profits for the first quarter of 1871 amounted to twenty-seven per cent. of the capital invested. Three similar stores in Weymouth averaged 20 per cent. profit; one in Worcester has a capital of \$7,000. At North Adams the Crispins have a co-operative manufactory that has started on a capital of \$6,000, and on which they cleared in four months \$1,014.10, and have now increased their stock capital to \$8,000. In these ways and by the scheme of industrial partnership, the Massachusetts Crispins are improving their condition, without placing themselves in antagonism with the rest of mankind.

The Dayton Short Line.

Our readers will remember that the Cincinnati & Springfield Railroad made a vigorous effort to secure from the Legislature the right of way for its trains through Dayton, and that it was defeated. It has recently transpired that as long ago as last May it obtained a lease of the right of way through Dayton from the Pittsburg, Columbus & Cincinnati Railroad, which holds a lease of the Dayton & Western Railroad. The lease secured by the Short Line includes also the use of the railroad bridge over the Great Miami river, in the southern limits of Dayton. This puts the new road through Dayton in the most desirable shape.

The suit of the Short Line vs. the heirs of N. Longworth, for 3 65 acres in Lockland for track and depot purposes, terminated on Saturday by the jury bringing in a verdict for \$2,700. The witnesses for the defendants valued the land at an average of \$5,200, and those for the plaintiff valued it at \$2,000.—*Gazette*.

Cotton—The Old and New Crops.

Partial returns of the movements of the cotton crop during the year ending Sept. 1, 1871, place us in a position to form an estimate of the supply for the year that has just closed. The receipts at all the shipping ports, Aug. 25, amount to 4,002,461 bales, against 2,898,109 bales for the year ending Sept. 1, 1870, and 2,260,537 in 1869, which gives an increase of 1,204,352 bales for the cotton year just ended, 1870-71, as compared with the preceding year. Returns by mail may correct possible errors by telegraph, but the general result will not vary considerably from the figure now given. It thus appears that the cotton crop of 1869-70 is only about 300,000 bales less than the famous crop of 1859-60, ten years previous, which produced 4,669,770 bales, the largest ever known.

At this period it may not be uninteresting to recur to the various estimates of the supply of cotton during the year that has just terminated. A year ago the croakers pretended to doubt whether there would be any increase on the supply of the previous year, and many questioned whether a crop of 3,000,000 bales would be realized. The *Economist*, however, estimated an increase of about 1,300,000 bales, and this anticipation has been realized with remarkable accuracy. We based our estimates on authentic intelligence of the increased acreage planted, the increased use of fertilizers, and the tendency towards the centralization of negro labor and planting in the more fertile cotton regions in the Gulf States. The weather, also, had been exceptionally fine, both for planting and picking. It was not, however, until the exports had almost exceeded the entire amount of the crop of the preceding year that the fact of the immense increase was fully realized by the public. This knowledge was followed by a decline of price, but a partial recovery has taken place in view of the largely increased consumption, both in Europe and America.

Respecting the production of the crop of 1870-71 now coming forward to market, the data are less reliable and satisfactory than could be desired. We have had the usual alarmist rumors, and an estimate by the Bureau of Agriculture of a very large falling off in the supply. But experience shows that the estimates and returns of that institution are not of the slightest value. The facts so far do not point to any large increase on last year's supply, but neither do they warrant any estimate of a decline. We have nearly always reason to anticipate an increased supply of the staple, unless counteracting causes, such as injury to the crop by worms, or bad weather, interfere to prevent it. During the year that has closed, we have had scarcely any authentic news of extensive damage by caterpillars, so that the injuries are confined to those caused by the weather. During the last couple of weeks a severe storm on the Southern coast has no doubt seriously interfered with the picking and injured the staple. We have yet to hear, however, of the actual damages sustained.

From the other parts of the cotton area we hear the usual fluctuating reports. In Mississippi the crop is said to be all that could be desired. In Northern Georgia, and Alabama, and Western Texas, the drought has caused extensive injuries. We hear of the devastations of the army worm in portions of Louisiana and other places. But it is to be noted that the injuries are nearly always exaggerated, while the favorable news is held back. In view of all the drawbacks, we are scarcely

warranted in anticipating any considerable increase in last year's supply, but neither is any falling off to be looked for. An estimate of a supply of 4,500,000 bales for the year just commencing would be entirely within the bounds of probability.—*Economist*.

Drumming vs Advertising.

There are said to be 25,000 drummers sent out of New York city alone. These average at least \$1,500 in salary and commissions, or \$37,500,000 paid to the whole number in salaries. If to this we add their traveling expenses, \$4 a day, and estimating they are upon the road 150 days during the year, we have an item of \$15,000,000 more, and an aggregate of \$52,000,000, which is added to the price of goods sold. As there are about 300,000 retail stores in the country which the goods eventually reach, we find every dealer taxed \$175 per year to sustain this army of drummers from New York city alone. We would not be understood to say that in all instances, and under all circumstances, the employment of traveling salesmen should be dispensed with, for under certain circumstances it is an absolute necessity. In introducing a new article to the attention of the trade, or a new or improved package or manner of putting up goods, in specialties generally, or whatever can not be described intelligibly, or understood clearly without seeing the article, then such a course becomes indispensable, and an advantage to both buyer and seller. But even then, after such an article, or staple, or manufacture has become universally known, the drummer can be dispensed with to the advantage of both parties. Leading firms in every line of business, who have hitherto refused to make known their business in any other way except through the expense of maintaining a dozen or more drummers scouring the country, have dispensed with their services, and returned to a system of judicious advertising, which can not fail to be highly remunerative. Those who have tried the two systems are loud in their praises of the latter method. A firm laboring under the necessary heavy expenses of maintaining a dozen salesmen at a cost of \$25,000 to \$50,000 per annum, can not afford to sell its goods at as low a figure as a firm whose expenses are reduced by the same amount. Indeed, experience proves that competition by the latter against the former is almost impossible.—*Grocer*.

✂ An elaborate and exhaustive examination of the circumstances under which machines for the production of artificial ice can give the most favorable results, has been made by Prof. C. Siede. Among other results, he finds that a theoretically perfect ice machine can produce three hundred pounds of ice per hour per horse power, or about one and one-half tons in ten working hours, the ice being at 25° F., and produced from water at 50° F. Using three pounds of coal per hour per horse power, one pound of coal would be sufficient to produce one hundred pounds of ice; but as the most perfect ice machines show, one pound of coal produces but ten pounds of ice, the loss of the effect being nine-tenths of the result theoretically possible. "It would seem from this, that the prospect of solving the problem for making ice by machinery, so that the cost of production of it may be reduced considerably below the present, is not very flattering, especially when we consider that a great part of the loss of effect is caused by circumstances which can not be avoided."

Needle-making at Redditch.

A pleasant run of about fifteen miles from Birmingham, on the Midland Railway, brings us to the great center of the English needle trade. Redditch is a fair-looking, compact, clean country town, surrounded by some of the most charming scenery in Worcestershire, and presents a striking contrast to the black and busy "hardware village" we have just left behind us. Why the needle-makers chose this place above all others in which to settle down to the pursuit of their calling, there is no evidence to show. As early as the year 1650, however, one Christopher Greening appears to have set up a needle shop at Little Crenndon, a hamlet just outside of Redditch, and he was followed in the course of a few years by several other members of the craft from London. In a short time, however, Long Crenndon was abandoned, owing to the absence of water power, and the needle-makers established themselves at Alcester, Studly, and Redditch. In times still more remote the district lying between Alcester and Redditch was a great industrial center of some kind, mills dating from monastic ages, and great names, no longer used, still remaining to tell of a departed and forgotten industry.

The first mills used in the needle trade were horse mills, one being established at Studley very early in the last century. These mills were used for scouring and pointing needles, superseding the primitive method of wrapping up the needles in buckram with emery dust and olive oil, and rolling them to and fro by the movement of the workman's foot. The earliest needles made in this district were "square-eyed," a sharp most readily produced. It was with square-eyed needles that Mary, Queen of Scots, wrought those beautiful tapestries for the walls of her prison cell. After many fruitless attempts, drilled eyed needles were successfully brought out in 1826, and two years later the burnishing machine, which gave a beautiful finish to the eye, was introduced. In this latter process, as now carried out, the needles are threaded on steel wires which have been "roughed" with a file and hardened. The ends of these wires are then attached to a steam machine by which the needles are made to revolve at an enormous speed with an oscillating motion round the wires. Previous to the year 1840, needles were hardened in water, during which process the majority became crooked, and straightening the crooks, was, in consequence, an occupation for considerable numbers of workpeople. In the year mentioned, however, a Redditch manufacturer revived the practice of hardening in oil, and the result was that crooked needles were the exception instead of being the rule. This so exasperated the crooked straighteners that they mobbed the enterprising manufacturer out of town, and for some time great tumult prevailed. Eventually, however, the revived process came to be generally adopted. A pointing machine is the latest invention of importance in the needle trade. On this invention, Messrs. Bartleet & Woodward—two excellent authorities—thus reported a little while since. The needle-pointing machine is an English invention, though it is not generally supposed to be so, and its forerunner, which, though not perfect, approached so nearly to perfection as to alarm the pointers, was some years ago purchased by them, and broken to pieces on Redditch Church Green. The needle-pointing machine is as yet only partially used in this district. A grooved grindstone, revolving at great

speed, is employed to grind the end of each wire into the desired shape. To this grindstone the wires are applied from an inclined plane, on which a number are placed ready cut to the length required. By means of a disc, surrounded with caoutchouc, revolving slowly in a direction transverse to the grindstone, a continuous supply of wires rapidly revolving in succession is supplied to the stone, and the same disc causes the wires to revolve whilst being pointed.

In Redditch and the neighborhood, needle-making now employs something like 8,000 workpeople, a considerable proportion of whom are female. The earnings considerably vary, those of children ranging from 1s. 6d to 2s., women, 8s. to 15s., and men, 12s. to 40s. per week. A needle has to pass through seventy pairs of bands before it is considered to be finished and ready for use; a subdivision of labor to which may be attributed the combination of excellence and cheapness in the production of these articles. The variety of needles made in these days is marvelous, the surgeon, tailor, harnessmaker, bookbinder, felt worker, sailmaker, saddler, glover, embroiderer and housewife, each requiring needles of shapes, sizes and lengths almost infinite. Redditch and the immediate district may be regarded as the only important center of the needle trade in the three kingdoms. The principal seat of the industry on the Continent is Aix-la-Chapelle, but at Lyons, and one or two towns in Normandy, the common qualities are also largely made. The Chinese supply their own requirements in the needle way, and it is thought that the craft is more ancient in the Celestial Empire than in Europe. Certain it is, that round eyed needles were made in China long before the primitive square-eyed ones were known in England. There is nothing new under the sun!

The Precious Metals.

Statistics have been furnished showing the gold yield of the world for eighteen years, from 1848 to 1865. It is estimated that at the commencement of the Christian era the amount of gold in existence was \$427,000,000. This means of course the amount of yellow ore above the surface of the earth, and in use as ornaments, &c., on deposit and in circulation. This amount had diminished at the discovery of America, in 1492, to \$37,000,000. In 1600 the amount rose to \$105,000,000; at the end of that century it was \$351,000,000, and at the beginning of this century it was \$1,251,000,000. From 1800 to 1860 it had increased to \$4,000,000,000. It is estimated that from the commencement of the Christian era to the discovery of this continent gold to the amount of \$3,800,000,000 had been taken from the surface and mined. The estimated annual average product of gold at the commencement of the Christian era is \$8,000,000, which had diminished at the time of the discovery of America to \$100,000; in 1600, it was \$2,000,000; in 1700, \$5,000,000; in 1800, \$15,000,000; in 1843, \$31,000,000; in 1850, \$88,000,000; in 1853, \$235,000,000; and in 1860, it had fallen to \$210,000,000. The aggregate product in all the gold producing counties in the world for eighteen years, from 1848 to 1865 is stated by the *Financial and Commercial Chronicle* to have been \$3,341,500,000. Of this the Pacific States and Territories produced nearly one-third, and Australia and New Zealand nearly one-fourth. For this period the average annual production was \$185,638,888. During the same period

of eighteen years, the silver product amounted to \$1,620,400,000, that of gold being \$3,341,500,000. The average yearly yield of silver was \$90,022,222, to \$185,638,888 of gold. The relative value of gold and silver was in the time of Abraham, 1 to 8; B. C. 500, it was 1 to 13; A. D. 500, 1 to 18; A. D. 1600, 1 to 13; A. D. 1700, 1 to 15½. In view of the immense yearly production of gold, a serious question arises as to the probabilities of its depreciation as a medium of exchange. The annual loss by the wear and tear of coin only averages one-tenth of one per cent., and the loss by consumption in the arts, by shipwreck and fire is estimated at one to three millions a year, a mere bagatelle in comparison with the annual production. The rule that an increase in the supply diminishes the value of an article holds good in everything else, and the question is, how far will this affect the value of gold. Of course, the constant increase of population and the spread of civilization and its currencies must be taken into consideration in connection with this subject. In Holland and Belgium silver has been taken as a standard of value, and it is noticed as a curious fact that in California many long leases of real estate are made, not for gold, but for the current price, at time of payment, of so many bushels of wheat.

The Nature of Various Gums.

The following information, which is reproduced from *Dingler's Journal* by the *Chemical News*, will be of use to many of our readers:

Dr. Sacc, of Neuenberg, Switzerland, has made an extensive inquiry into the nature of different resins. The resins spoken of are copal, amber, dammar, common resin, shellac, elemi, sandarach, mastic, and Caramba wax. All these resins can be reduced to powder.

The following will become pasty before melting: Amber, shellac, elemi, sandarach, and mastic; the others will become liquid at once.

In boiling water, Caramba wax will melt; common resin will form a semi-fluid mass; dammar, shellac, elemi, and mastic will become sticky; while copal, amber, and sandarach will remain unchanged.

Dammar and amber do not dissolve in alcohol; copal becomes pasty; elemi and Caramba wax dissolve with difficulty; while resin, shellac, sandarach and mastic dissolve easily.

Acetic acid makes common resin swell; on all the others it has no effect.

Caustic soda dissolves shellac readily, resin partly; but has no influence on the others.

Amber and shellac do not dissolve in sulphide of carbon; copal becomes soft and expands; elemi, sandarach, mastic, and Caramba wax dissolve slowly, while resin and dammar dissolve easily.

Oil of turpentine dissolves neither amber nor shellac, but sweetens copal; dissolves dammar, resin, elemi, sandarach, and Caramba wax easily, and mastic very easily.

Boiling linseed oil has no effect on copal, amber, and Caramba wax; shellac, elemi, and sandarach dissolve in it slowly, while dammar, resin, and mastic dissolve easily.

Benzol does not dissolve copal, amber, and shellac, but does elemi and sandarach to a limited extent, and Caramba wax more easily; while dammar, resin, and mastic offer no difficulty.

Petroleum ether has no effect on copal, amber, and shellac; it is a poor solvent for

resin, elemi, sandarach, and Caramba wax, and a good one for dammar and mastic.

Concentrated sulphuric acid is indifferent to Caramba wax; it dissolves all resins, imparting to them a dark brown color, excepting dammar, which takes a brilliant red tint.

Nitric acid imparts to Caramba wax a straw color; to elemi, a dirty yellow; to mastic and sandarach, a light brown; it does not affect the others.

Ammonia is indifferent to amber, dammar, shellac, elemi, and Caramba wax; copal, sandarach, and mastic become soft, and finally dissolve; while resin will dissolve at once.

It is not difficult, by means of these reactions, to test the different resins for their purity.

Dyer's Recipes.

Ponceon.—100 pounds of fabric. Color scarlet first, as given in recipe for scarlet on wool, but leave out the flavine, or yellow dye stuff. After the goods are well rinsed, prepare a kettle with fresh water; heat it to 180 degrees Fah.; strain into it 5 pounds of cochineal paste; stir all well together, and enter the fabric, handle it for half an hour without boiling; rinse and dry. Instead of ammoniated cochineal, 3 ounces of magenta crystals may be used.

Pink for Listings.—To 100 pounds of wool use 8 pounds of cochineal, 5 pounds of tartar, 10 pounds of scarlet spirit, ½ pound of tin crystals. Boil all together until dissolved; then cool off the dye to 170 deg. Fah.; enter and handle well, boil for half an hour. If the wool should not color even in ten minutes, use a few pounds of muriatic acid. If this color be used for listings on white flannels, add about 6 pounds more scarlet spirit to the wool, just before taking it out. This additional tin acid will fasten the cochineal more, without rotting the wool. The color will stand the soap better; and to keep the color from running before bleaching entirely, the scourer must add a solution of 1 pound muriatic acid to the last rinsing of the flannel. If the cochineal should have stained the white, then rinse in cold water before fastening the spots, by the sulphur, when bleaching.

Madder Red.—This color is mostly used for army uniforms. To 100 pounds of fabric use 20 pounds of alum, 5 pounds of tartar, and 5 pounds of scarlet spirit. After these are dissolved, enter the goods, and let them boil for two hours; then take them out, let cool, and lay over night. Into fresh water stir 75 pounds of good Holland madder. Enter the fabric at 120 deg. Fah., and bring it up to 200 deg. in the course of an hour, during which time it must be handled well to secure evenness; then rinse and dry.

Hypernic Red is generally used for carpets and zephyrs. 100 pounds of yarn are boiled in a solution of 15 pounds alum, and 3 pounds half-refined tartar, for one hour, or, what is just as well, laid over night in the hot liquid. The color is much improved if this prepared yarn can lay a few days in the atmosphere before coloring it red. In fresh water boil 30 pounds of hypernic, or beechwood, for ten minutes. Cool the liquid to 170 deg. Fah., then add 3 pounds of whiting or chalk; handle in this the prepared yarn, for ten minutes; bring up the heat to 200 deg., when the yarn will be a fine red; in half an hour it will be ready to take out and cool. For carpet yarn, it is not necessary to rinse, but to dry as it is. If hard water is to be used, as in some localities, the chalk is unnecessary; but the latter

surely adds brilliancy to the color, equaling cochineal. Use in the preparation no blue vitriol, which dulls the color.—*Haserick's Secrets of Dyeing.*

SHEET IRON.—The New York *Bulletin* of the 4th, says: Most of the sheet iron used in this country is manufactured in Pennsylvania, and is the product of the mines of that State. Its uses are various, but the bulk of it is used for making common stove pipe. A small quantity of sheet iron comes from England, and is sold in this market for about the same price as native iron. English iron pays a duty of about three-quarters of a cent per pound. Formerly all the common sheet iron was imported from England, but the quality of the American iron is so much better that it is used in preference. The finest quality of sheet iron is from Russia, no other nation having as yet succeeded in producing sheet iron with so fine a surface. Russian iron comes in sheets 4 feet 8 inches in length by 2 feet 4 inches in width. Most of the Russian iron intended for this market is imported direct, though a small quantity comes through England. The importations amount to 7,000 packages yearly, each package weighing 230 pounds. It is used almost entirely for making stoves and covering locomotive boilers. Russia iron pays a duty of 2½ cents per pound. The market is at present well supplied with all kinds of iron and prices are steady. The importations of sheet iron for the week are 154 tons, making 2,695 tons since the first of the year, against 2,143 tons for the same period last year.

The *Pittsburg Commercial* gives a new method of testing steel, so as to insure uniform and superior quality in steel rails. By the Griswold method, a test ingot from each five ton ladleful of liquid steel is hammered into a bar and tested for malleability and hardness, and especially for toughness, by bending it double when cold. In case the test bar falls below the standard suitable for rails, all the ingots and the rails rolled from them are stamped with the number of the ladleful. To ascertain whether the rails will endure actual service on the track, a piece is cut from one rail in each charge, and is tested by placing it on iron supports, one foot apart, and then dropping a weight of five tons upon the middle of it, from a height proportioned to the pattern of the rail. In case the test rail does not stand the blow deemed proper, all of the rails made from that ladleful of steel are rejected for use on railways.—*Railway Review.*

An English magazine proposes a highly original method for the manufacture of sodium on a large scale that deserves to be tested. The vapor of chloride of sodium produced by passing hot air through melted salt is conducted over quartz or feldspar heated to whiteness. Chlorine gas is evolved which can be economized in the manufacture of bleaching powders, while the silica takes the soda in the form of silicate. The silicate of soda is afterward decomposed by heating it with lime and charcoal, and passing carbonic oxide gas over it as a reducing agent, producing silicate of lime and vapor of sodium, which latter must be condensed in naphtha. If silicate of soda can be economically prepared in this manner, it is a question whether the process could not be employed as a step in the manufacture of soda ash in preference to the famous invention of La Blanc.

More Litigation for the I., C. & L. Railroad.

HENRY C. LORD SUED FOR A QUARTER OF A MILLION.

Thomas A. Morris and Melville E. Ingalls, receivers of the Indianapolis, Cincinnati & Lafayette Railroad, have filed a petition in the Court of Common Pleas against Henry C. Lord, to recover \$248,807 87, with interest.

The first cause of action is for \$30,000, for shares of stock of the Terre Haute & Indianapolis road, which they say Lord converted to his own use while President of the I. C. & L. road in 1866, having access to the property and assets of the company.

The second cause of action charges him with taking 900 shares of the stock of the Cincinnati & Martinsville Railroad Company, the property of the I. C. & L., in 1868, valued at \$90,000.

The third cause of action charges that, in July, 1868, he converted to his own use eleven bonds of the I. C. & L. road, known as the bonds of 1858, valued at \$10,500.

The fourth cause of action charges him with taking July 1, 1869, ten other bonds of the same road of the issue of 1867, valued at \$10,000.

The fifth cause of action charges him with taking, July 1, 1869, twenty-nine bonds of the Cincinnati & Indiana Railroad Company, known as the bonds of 1867, and valued at \$29,000.

The sixth cause of action charges him with taking, July 1, 1870, seventeen bonds of 1869, of the Indianapolis, Cincinnati & Lafayette Railroad Company, valued at \$17,000.

The seventh cause charges him with having received of W. F. Reynolds, July 25, 1866, for the use and on account of the I. C. & L. Company, the sum of \$15,000, which he converted to his own use.

The eighth cause charges him with having converted to his own use \$35,000, received Jan. 1, 1870, from the American Union Express Company.

The ninth cause of action charges him with having executed a note of the I. C. & L. Company for \$12,000, Sep. 28, 1870, which he afterwards negotiated, and converted the proceeds to his own use, compelling the plaintiffs to pay \$12,304 87 in order to obtain valuable collateral property which had been pledged for the payment of the note.

These several counts aggregate \$248,804 87, which, with interest, swells the whole amount to more than a quarter of a million.

Messrs. Cox, Burnett and Follett are attorneys for plaintiffs.

THE TAX ON DIVIDENDS—Caleb Cushing has had an interview with Secretary Boutwell in regard to the collection of the tax on dividends of the Boston hanks for the last five months in 1870. It will be remembered that Commissioner Pleasonton decided that the law did not authorize the collection of the two and one-half per cent. tax for that period. This decision was subsequently reversed by the Secretary in accordance with the opinion of Attorney-General Akerman, and the Commissioner was ordered to collect the tax. Finding that it would be impossible to do this in case of interest represented by coupons that portion of the order was revoked. The Secretary now announces that the tax on dividends declared during that time by banks, railroad companies and other corporations, must be collected, and that he shall hold the hanks responsible for the payment of this tax.

ALABAMA & CHATTANOOGA RAILROAD BANKRUPTCY CASE—MONTGOMERY, Sept. 16—The United States Circuit Court, Judge Woods, refused the appointment of a Receiver, on application of W. F. Drake, second mortgage bondholder of the Alabama & Chattanooga Railroad, on the ground that the State Courts have possession of the road and jurisdiction through the Receivers.

Judge Woods, on petition of W. A. C. Jones, a second mortgage bondholder for one hundred thousand dollars, granted an order to show cause on the first Monday in November before the United States District Judge why the Alabama & Chattanooga Railroad should not be declared bankrupt.

The maneuvers of the Russian troops will be on a grander scale than usual this year. A novel feature will be the construction of a railroad by soldiers who have been trained for that purpose. In 1869 a number of troops were sent to the different railroads for instruction, with a view to the ulterior formation of companies capable of building, destroying or managing railroads in time of war. During the coming evolutions these men will lay down rails to connect the Peterhoff and Warsaw lines. The distance is a little over five miles, and the work must be completed in ten days, so that the line can be made use of for the transportation of troops during the last four or five days of the maneuvers.

The project of cutting a ship canal through German territory from the North Sea to the Baltic has been again revived. According to the present plan the length of the canal could not exceed 60 English miles, but no trace has yet been fixed on as several ports of Schleswig-Holstein claim the preference. The projectors claim the work presents no engineering difficulties, as the plateau through which the canal would have to be cut has nowhere a greater elevation than 68 feet. The proposed breadth is 76 feet at the bottom and 224 feet at the water line; the depth would be in the middle 31 feet, which would permit the largest ships to pass in safety. The government engineers estimate the cost at one million thalers.

HIGH-PRESSURE FILTER.—A new description of filter is exhibited at the International Exhibition; it is constructed in the following manner:—The case (which is made of cast-iron, enameled inside to prevent it being acted on by the water) contains three distinct filtrations, through which the water is forced by the regulation of the pressure. The water first passes through loose particles of pure animal charcoal, then rising, through the pressure, into an inner chamber, also filled with loose charcoal, descends through two hollow blocks of pure animal charcoal compressed by hydraulic pressure, by which process the blocks are rendered more durable than those hitherto used of vegetable charcoal compressed by hand. This invention is better than placing the filter in the cistern, as the water for use is obtained directly from the filter itself, thereby preventing the possibility of its acquiring any deleterious quality in its passage through lead pipes from the filter to the tap. The filter being connected with the main pipe, the trouble of keeping it filled, as is necessary with most other kinds, is obviated, and this also produces a continuous flow of water equal to that supplied by the ordinary tap. It can be very easily cleaned without removal or expense.

RAILROAD NOTICE.**The Cincinnati & Great Northern Railroad Company.**

The undersigned Corporators of the Cincinnati & Great Northern Railroad Company hereby give notice that more than ten per centum of the capital stock authorized by the Articles of Association of said Company has been subscribed, to-wit, eight thousand eight hundred and twenty (\$8,820) shares; the said Corporators therefore give notice for the said stockholders to meet at the office of the Railroad Record, No. 167 Walnut street, Cincinnati, Ohio, on Saturday, the 30th day of September, A. D. 1871, at 11 o'clock A. M. of said day, for the purpose of choosing seven directors of said Company. A full attendance is requested.

A. J. HODDER,
DURBIN WARD,
T. WRIGHTSON,
S. W. MORTON,
ROBT. HEDGER,
Corporators.

CINCINNATI, O., Aug. 30, 1871.

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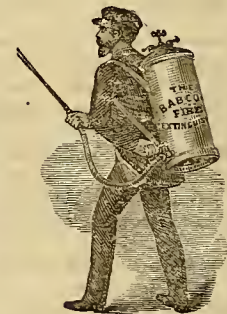
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122 Washington Street,

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H. J. BOND, Gen'l Agent,
22 West Fourth Street,
CINCINNATI.

The Railroad Record.

E. D. MANSFIELD, - - - - } Editors
T. WRIGHTSON, - - - - }
A. J. HODDER, - - - - }

CINCINNATI, THURSDAY, SEPTEMBER 28, 1871.

The Railroad Record,

PUBLISHED EVERY THURSDAY MORNING,

By Wrightson & Co.,

OFFICE—No. 167 Walnut Street

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The Increase of Freights on Railroads, and some of the Causes and Consequences.

A railroad gentleman said to us, in reply to our urging the great advantages of a new entrance to the city on the upper plain, that it would not be profitable. We said, why not? He said, that the greatest part of the profits of railroads was from freights, and that the freight business of the roads would go round on the lower level in any event. The last proposition is not evident to us; and indeed we think it is not so; for, if the tunnel be made, roads will connect with it on the upper plain, and connect west, at precisely the same grades and expense they do now. They will connect at points 20 miles back, and have no ascending grade, and they will descend on the west with no more grade than in coming into the city. We do not see, therefore, any objection on that score. But the first proposition, that the business of railroads is most largely made up of freights, is true; and the rapid progress of freights is a curious fact in railroad history. The causes of it, and the results of some of the causes in future, are well worthy considering, for they make a part of the philosophy of material production. In order to elucidate this, and also to show (as we have done to some extent in previous articles) the immense advance and also profits of railroad business, we have carefully compiled the following table from the Report of the Commissioner of Statistics for 1860, and that of the Commissioner of Railroads (General Wright) for 1870. The table is both valuable and striking:

Roads.	In 1860.		In 1870.	
	Pass'gers.	Ton'ge.	Pass'gers.	Ton'ge.
Cin. Ham. & Day.	355,709	925,066	735,017	419,350
Cleveland & Col.	195,908	286,219	583,691	83,642
Cleveland & Pittsb.	281,392	350,000	631,047	1,147,448
Pittsburg & Ft. W.	413,317	466,619	1,857,949	1,628,346
Little Miami.....	343,780	503,616	455,785	476,542
Central Ohio.....	177,045	195,946	212,470	211,305
Cin. & Sandusky...	136,841	84,227	241,500	245,937

Seven roads..... 1,903,992 1,912,293 4,730,463 4,950,540

Increase of passengers in 10 years, 148 per cent.

Increase of tonnage in 10 years, 158 per cent.

The increase of tonnage is but slightly greater in proportion than that of passengers. But this is not the true test of profits. In looking into the returns of the Pittsburg & Fort Wayne road, we find that the average rate per passenger is 140; while that per ton is 280. At the same time the operating expenses of the road were only 45 per cent. But let us assume them at 60 per cent., which is, perhaps, the average of roads. Then the average account will stand thus:

Average receipt per passenger.....	\$1 40
Average expense per passenger.....	.84
Net profit from one passenger.....	.56
Average receipt from one ton.....	\$2 80
Average expense from one ton.....	1.68
Net profit from one ton.....	1.12

If, therefore, the road gets one passenger it gets 56 cents more profit; but if it gets one ton more, it gets \$1.12 (exactly double) more profit. Now let us apply this to the actual increase of passengers and freight as exhibited in the above table for the Pittsburg & Fort Wayne road:

Actual increase of passengers 1,244,332, at 56 cents.....	\$696,825
Actual increase of tons 1,161,697, at \$1.12.....	1,300,099

We see here at once how it is that roads derive their largest profits from freights; and if we look into the production of the country, we shall see that the freights on railroads must hereafter increase faster than the passengers, and if the rates be not reduced, that the profits on railroads must be greatly increased hereafter. In the meantime, let us look into the above results, and see what ten years have done for railroad business and profits. In ten years the passenger traffic increased 14 per cent per annum! and the tonnage 15 per cent. per annum! Now it is very important to know whether this will continue. Let us see then out of what elements this increase grows; and what is its proportion to other elements of increase in this State (for these proportions are taken from the statistics of railroading in Ohio):

Increase of population, per annum, 1.5 per ct.
Increase of production, per annum, 4.0 per ct.
Increase of railroad traffic..... 14 per ct.

If we should draw conclusions from these facts, we should say, that railroad business ought not to increase more than 4 per cent. per annum, the rate of the increase of production; but we find, in fact, that the increase of railroad business is at least 14 per cent. per annum! How can we account for that? In this way: the greater part of the tonnage of

railroad freights is made up of the actual products of the country through which the railroad passes. Well, suppose the products of the country are only equal to the consumption of the people on the road, then very little or nothing will be carried by the railroad of the products of the country. But suppose there is a surplus of 10 per cent., then all of that surplus will be carried by the roads. So that the real question of what portion of the products of the country is carried by railroads is not what is the increase of those products, but what is the increase of the surplus of products, for that is all the roads carry, and that is a totally different thing from the increase of products. Take the practical case. Say, for example:

Ohio produced in 1860.....	116,000,000 grain.
Surplus	40,000,000 “
Ohio produced in 1870.....	160,000,000 “
Surplus	68,000,000 “

We see, then, that while the people increased 15 per cent., and the crop 40 per cent., the surplus increased 70 per cent., that is, 7 per cent. per annum. This, then is one of the elements of the increase of railroad traffic; but that is not all. With the increase of towns there comes a vast increase of manufactures, and in the transportation of those manufactures; and then there is a great increase in the consumption of foreign articles in towns, and this again is an actual increase of railroad freights. We then see how it is that railroad freights increase so rapidly, and become so profitable to the roads.

We have no space to pursue this subject further; but in another article we shall pursue this subject to its consequences, which we think will be the continuance of this vast increase of railroad traffic.

The Street Railroads.

We see that measures are taken to make the Inclined Plane between Mt. Auburn and the city. The friends of this measure expect great advantages from it. We hope they will not be disappointed. But it seems to us that there will be always difficulty and some danger attending Inclined Planes. But at any rate there must be street railroads from the city up to the hills and among the valleys and on every side. The future city is to be outside the lower plains of the present city, and there must be outlets. Where is the road to Walnut Hills? There is no road from the city wanted more than that. But we suppose it is waiting the slow progress of Gilbert Avenue. Let Gilbert Avenue be made quickly and street railroads be multiplied; but in the meanwhile we think the tunnel is to be the great avenue north. It is absolutely necessary, and let it be made. When made, all doubters will cease to be skeptical, and the tunnel stand out as the best of all the railroad schemes and of all avenues from the city.

The Great Northern Railroad.

We have before us a pamphlet entitled "Exposition of the Great Northern Railroad." This exposition considers the road in two lights, either as a through line from Mackinaw to Cincinnati and the South, or as a local line from Cincinnati to Lansing, the seat of Government in Michigan. In either aspect, the exposition is a complete demonstration of the importance and profit of this work. Considered as a through line from the center of the Great Lakes to the Southern Atlantic, is almost impossible to conceive the magnitude of its importance, or to calculate the extent of its profits. It passes through sixteen degrees of latitude and embraces every variety of products. In 1870, the Pennsylvania road with 1,200 miles of track received seventeen millions of dollars, gross receipts; a road from Mackinaw to Savannah through Cincinnati, will be 1,250 miles, and will receive more than the Pennsylvania road. As a local road, the tables which accompany the report demonstrate that the road from Cincinnati to Lansing, 280 miles, will pay $11\frac{1}{2}$ per cent. from the beginning. We welcome the Great Northern Company to this fruitful field, both of profit and of usefulness. Let the road be made!

The Great Exposition.

We have had little time to look into the Exposition, but we understand from all persons who have been there that it is really a wonderful exhibition of the industry of Cincinnati and the surrounding country. It is a grand museum, but it is much more than a museum; it is an exhibition of genius, of industry and of vast power. It is in this aspect that Cincinnati stands forth a type of the vigor and enterprise and industry which characterize this western world. A city which in ten years doubles the values of its industrial arts, and permits thirty or forty new varieties of manufactures, is not one to stop growing; but on the contrary to go ahead with new power and rapidity. Let this Exposition be made every year, and there can be no evidence or advertisement of the genius, growth and greatness of Cincinnati so good as this, and nothing which will contribute more to its prosperity. "In 1870," say the Board of Trade, "the value of manufactures in Cincinnati amounted to \$127,000,000." This seems an enormous amount, but we doubt not it will be doubled in a few years more.

Arrangements have been made by a firm in New York to publish daily a map of the United States, showing the state of the weather at the different signal stations. Corrections will be made for the conditions of the barometer, thermometer, velocity and direction of the wind, and copies of the diagram will be delivered to subscribers in the forenoon of each day.

Iron—Where we get it.

We buy from the little island of Great Britain a great many things; among others we bought during the first eight months ending August 31, of this year and the corresponding period of the two preceding years, the following comparative amounts in tons:

	1869.	1870.	1871.
Railroad Iron.....	229,145	279,616	335,162
Pig Iron	89,704	75,061	119,098

This shows an increase of imports of railroad iron for the first eight months of this year over the corresponding eight months of last year of 55,546 tons, and over the same period of the year 1869 of 106,017 tons. Of Pig iron, the increase per cent. is more marked, there having been imported this year 44,037 tons more than during the same period of last year, and 29,394 over the year 1869.

The New Town of Huntington, Va.

The *Ironton Journal* of last week gives this account of a visit of the editor to the new town now being built up at the Ohio river terminus of the Chesapeake & Ohio Railroad:

A visit to Huntington last week disclosed to us the rapid building up of the new city. Hundreds of men are at work grading the streets and wharves. A large number were laying track, switches, &c., for the C. & O. R. R. About 300 men were at work on the round house, and everything indicated vigor and enterprise. A large quantity of railroad iron has arrived, and will be laid as soon as the iron bridge across the Guyan river shall be in place, which will be in ten days hence. Col. Kuper has resigned, owing to ill health, and Col. Douglas has taken his place, assisted in Huntington by the pushing Mr. Morris.

Vient White, formerly of this place, and recently of Ceredo, has located and built in the new town.

About forty or fifty houses, mostly for mercantile purposes, are already up and being finished.

The Merchants' Hotel, a splendid bouse, kept by Mr. Geo. Scrannage, was built, furnished and equipped in eight weeks from the day of breaking ground. It is one of the best hotels in the country, and is crowded all the time.—*Highland News*.

Several narrow gauge railroads are projected in Pennsylvania. A company has been chartered to build a road of 30 inches gauge from Philadelphia, to connect with the Pennsylvania Central in Chester county, passing through Upper Darby, Hereford, Maple, New town and Paoli. In a week or two, work will be begun on another narrow gauge road from Bell's Mills station, on the Pennsylvania Central in Blair county, across the Alleghany mountains through Bell's gap, a distance of 12 miles, which will afford an outlet for the coal, lumber and iron of an important mountain district. Some of the gradients on this line will be over 100 feet to the mile. The Lancaster & Reading Narrow Gauge Railroad Company has been incorporated, with a right to build a road with a gauge not exceeding 4 feet, from the city of Reading; also to construct branches. There is also a movement on foot to build a narrow gauge road from Media to Chester, in Delaware county.

Railroad Statistics.

From Poor's recently published Railroad Manual we deduce some interesting statistics.

It will be found that commencing from the year 1841, at which time there were 3,535 miles of railroad, until 1848, the yearly increase was about 300 miles. From 1848 to 1855 there was a yearly increase of 1,700 miles; then for two years at the rate of 2,400 miles; and from that date a gradual diminution till the minimum yearly mileage was reached in 1861. From that date there was a gradual increase until the close of the war in 1865, when so great an activity was shown that while in 1865 the increase was 3,000 miles per annum, we find it last year to be 6,000 miles.

There are something like 1,300 to 1,400 railroads projected, in progress and completed, and the number is rapidly increasing.

As illustrating the variety of gauges and the number of each kind, we have deduced the following table, which shows the differences of practice in this country:

Gauge.	No. of Railroads.
3 feet	2
3 " 6 inches	2
4 " 3 "	1
4 " 3½ "	1
4 " 5½ "	1
4 " 6 "	6
4 " 8 "	3
4 " 8½ "	307
4 " 8¾ "	2
4 " 9 "	13
4 " 9½ "	3
4 " 9¾ "	1
4 " 9¾ "	7
4 " 9¾ "	1
4 " 10 "	30
5 "	74
5 " 2½ "	1
5 " 9 "	1
6 "	31

We find by examination that there are upwards of 10,000 locomotives and about 214,000 cars of all kinds, which makes a ratio of 1 locomotive to twenty cars. It must be recollected, however, that coal companies using a great number of cars (and those mostly four wheeled) with comparatively few locomotives increase this ratio, while only a few smaller roads constructed through mountainous country require greater locomotive power in proportion to the amount carried. Allowing 30 feet only as the length of a car, we would have, if all the cars were connected in one line, a train extending from New York to the Mississippi river; while, allowing 50 feet as the length of engine and tender, there would be a line of locomotives 100 miles long. The total mileage of railroads was 53,399 at the beginning of 1871. Illinois comes first in the total length of its roads; Pennsylvania follows closely, then come in order New York, Ohio, Indiana, and scattering along all the other States and Territories, concluding with Rhode Island, with 136 miles.

The Portland & Oxford (Me.) Railroad Company will change the gauge of their road from five feet six inches to three feet gauge. This is the first adoption of the narrow gauge plan in New England.

The Denver *Tribune* announces that a company has been formed in St. Louis to build a three feet narrow gauge road from that city to Leavenworth, in anticipation of the completion of the road from Leavenworth to Denver.

The Krupp Gun.

Steel gun making in the perfection of its details is best seen at Essen, in Rhenish Prussia, in the monster works of Mr. Krupp, since here the manufacture may be followed from the refining of the crude ore up to the finishing stroke and proof of the completed gun—while at the London Ordnance Works of Vauxhall, only the processes of assembling, rifling, etc., can be studied, the various parts being roughly prepared in Sheffield, at the steel works of Firth. Mr. Krupp's great establishment, originally designed for the production of rolling stock, rails, crank shafts, etc., has within the last decade been gradually so changed in its character as to now render it practicable to employ almost the entire force of mechanics in the fabrication of ordnance and artillery. An idea of the immense facilities here for turning out work may be formed from the following statistical statement:

The works cover an extent of about 700 acres, 300 of which are under roof, and employ 8,000 men; besides which, in the Krupp coal mines near Essen, and in the iron pits and blasting furnaces on the Rhine, 2,000 men are constantly at work providing material for the use of the establishment, which possesses for the consumption and manufacture of the products of the mines 480 smelting, reverberatory, and cementing furnaces; 247 steam engines, from 2 to 1,000 horse power; 54 steam hammers, from 1 to 50 tons weight; 169 forges, 331 lathes, 61 cutting and shaping machines, 93 grinding machines, and furnaces to accommodate 1,600 crucibles of 70 to 75 lbs. capacity each.

With these appliances, ingots can be cast and worked from the size required for a file blade up to that of 110,000 lbs. weight used in the 14 inch gun—thus representing a capacity three times that of the largest steel works in England.

The metal used in the Krupp gun is crucible cast steel, made from a combination of puddled steel and pure wrought iron, which forms the charge of the crucible. The proportions of each, manner of preparation, etc., are not made known, as the secret by means of which Mr. Krupp produces a metal fully equal in elastic and absolute strength to the best of English cementation steel, and that too without oil tempering, lies somewhere in the preparation of the elementary substances, or in the combination of them formed in the crucible. Only this is known: The wrought iron is produced from hematite ores, both English and German; the puddled steel from the spathic ore of Siegen; while the Spiegel-eisen, small quantities of which are used, is made from the long crystal variety of that ore found in Nassau. The ingots from which the various parts of the gun are formed are cast in cylindrical iron molds, the metal being introduced at the top. Every precaution possible is taken to insure homogeneity in the casting; for unless steel be absolutely sound in the ingot, no amount of hammering or pressing will make it so, as the bubble holes caused by air or gas become sealed without being removed, and all subsequent treatment simply presses them out into long slits, more objectionable than the original defect, since it completely prevents welding. When sufficiently hard to permit handling, the ingot is removed from the mold and buried in ashes, where it slowly cools. When needed for use, it is brought to the required heat in an ordinary furnace, and drawn out to the proper length under a hammer, one of 50 tons weight being used for large ingots. After this the head

containing the "piping" and all other defective metal is cut off, and the ingot thus drawn out again buried in the ashes, where it gradually anneals, taking out all tension due to forging into shape. Ingots thus drawn out are, by the various processes of boring, turning, and rifling, converted into the tubes forming the inner structure of the gun, while those intended for use as hoops, trunnion bands, etc., are cut up into short lengths of the required weight and formed into rings without weld, the pieces being split down the center to a certain distance from either end, and swedged out under a heavy hammer to the desired shape, after which they are annealed and finished by lathe work.

The Krupp gun consists of a central tube, and of series of encircling hoops—the 6 inch having one set, the 8 and 9 inch two, and the 11 inch and higher calibres, three. The tube, comprising the greater mass of the gun, is of cylindrical form, with walls eight-tenths of a caliber thick from a point over the middle of the charge to that at which the rings terminate; thence to the muzzle it is conical, diminishing to one-half caliber.

The hoops, shrunk on at a black heat, are prevented from working on the tube or inner layers by key rings, which are half hoops laid into scores cut to receive them.

The rifling is polygrooved, the two sides of each groove being of a different pitch, by which means the width of the grooves is made to diminish as they approach the muzzle, or what is the same thing, that of the bands increases, thus insuring complete suppression of windage as the soft-jacketed projectile passes along the bore. The chamber in which the shot and charge rest when the gun is loaded is of greater diameter than the bore, and its axis is eccentric to and above that of the rifled part. This is done to give desired working room and still retain the axis of the projectile as a prolongation of the axis of the bore, for by this the course of the shot, from the instant it is put in motion until it leaves the gun, is rectilinear, not being canted upward in passing from a tube of greater to one of less diameter, thus abrading its jacket, and at the same time allowing gas to escape by it, which occasions loss of power as well as scoring and damaging of the gun, an action which in a perfect breech loader is entirely prevented by the gas tight joint formed by the projectile when properly centered.

The most important detail in the construction of a breech loading gun is an efficient and durable gas check; and this has been successfully applied in large guns by Mr. Krupp alone. The rear of the chamber is reamed out spherically, and in this recess is fitted a Broadwell ring, whose exterior is also a spherical segment, the advantage of that form being its ease of adjustment and the readiness with which it can be pushed into position by the breech block should it become unseated. When the gun is discharged, the ring, being instantaneously expanded and at the same time pressed rearward with tremendous force, hermetically closes the tube of the piece and prevents all escape of gas. On its rear face are annular scores to take up residuum or oil from the face of the breech block and thus avoid clogging. In the slot cut in the rear end of the tube to receive the mechanism, two guides are left in relief, and in the breech block grooves are formed to correspond. These stand at an inclination to the face of the slot formed by the breech of the gun, so that a motion of translation in or out gives to the front face of the block, at the same time, a movement forward or to the rear

parallel to itself. The rear of the slot in the tube is cut on the same inclination as the guides, so that the block, whose front top and bottom are plane surfaces, its rear rounded off, is, when screwed in, well supported from behind.

The motion of translation is given to the block by a screw which runs partly in a thread cut in the upper wall of the slot. The locking is accomplished by a screw working in a nut having rings on its exterior partially cut away, which take in the scores cut in the solid mass at the rear of the slot. These screws are worked in turn by a lever wrench. The vent is through the breech block in a prolongation of the axis of the bore, terminating in the face plate.

Both steel and chilled iron projectiles are used in these guns for practice against armor. They are cylindro-ogival in form, with radius of head approximately two calibers. Those of steel are forged, bored out to receive the bursting charge, and have their points water-tempered. They are then jacketed by a process of soldering. It is of great importance that the weight of lead should be reduced to a minimum, in order to avoid loss of momentum on the striking of the shot, due to the flying off of the lead at the first instant of impact. After long experiment a plan has been devised by means of which practically no power is lost. The projectile, having been turned smooth on its cylindrical part, is placed in a bath of sal ammoniac to remove all oil, after which it is immersed in molten zinc, thence in lead, and afterward put in a mold where lead is run around it. It is then taken to a lathe, where the lead is turned down to a very thin coating, rings three to five in number, according to the caliber, being left on it, the rings being 0.1 inch and the spaces 0.05 inch thick.

The powder used in all the large guns is the prismatic, first suggested by General Rodman. Each grain is a hexagonal prism, 1 inch high, faces 0.8 inch wide, with six cylindrical perforations 0.15 inch in diameter running through it in the direction of its length. These prisms, of a density 1.70, average 12+ to the pound.

The following table presents some of the details of this ordnance:

Caliber.	Rough tube ingots.		Weight of finished gun, tons.	Weight of projectiles, lbs.	Weight of powder charge, lbs.	Relations.		Twist 1 turn in inches.
	Weight, tons.	Diameter, in.				Weight of shot to gun.	Weight of powder to shot.	
6 in	10	24	3 1/2	81	15	1-107	1-5.4	2 1/2
8 "	15	34	9	209	36	1-107	1-5.1	2 1/2
9 "	20	41	14 1/2	297	46 to 62	1-121	1-6.4 to 1-5.7	3
11 "	30	45	25 1/2	493	88	1-120	1-5.5	3 1/2
14 "	50	55	1000	185	1-124	1-5.3		4 1/2

The physique of the Chinaman is not robust or imposing, yet, on the gold fields of Australia, their muscular exploits are remarkable. Gangs of them are seen cheerily tramping from one mining district to another, each one bearing upon his shoulder, from which is slung two packages, embracing their mining implements and camp appendages, weighing on an average, about 200 pounds. The Mongolian muscle is not capable of as great exertion as the Caucasian, yet in protracted endurance it will come out ahead.

The Block Safety System in England.

Mr. Alfred Watkins, an English railway superintendent, has published a pamphlet in which he thus describes the block system of signaling in use on the South-eastern Railway, "a plan so efficient," says the *Economist*, "that for three years it has enabled that railway to be almost alone in its exemption from even minor casualties."

The true objects to be obtained in unimpeachable train signaling, are—I presume to consider—first, that no train shall be allowed to leave one signal station until that signal station has asked leave from the signal station in advance, and such second signal station has replied in the affirmative; second, that when the train has been so allowed to leave, the sending station shall inform the receiving station that the train has left, and the receiving station shall acknowledge that he has been so informed; third, that the signals of danger shall not be lowered until this process has been gone through; fourth, that a record, taken down at the moment, shall be kept in each signal box of the time of all signals.

These four conditions complied with will secure safety from collision so far as it can be secured by human agency. These conditions can only be realized in our modern practice by the use of the telegraph and the absolute block system. They are and have long since been realized on every part of the South-eastern system. I know of no other railway where the whole of the system is in application except on the South-eastern and London, Chatham and Dover. These two railways had no accident to report last year; whereas, the greatest and most prosperous of our railways—the London and North-western, Lancashire and Yorkshire, and North-eastern—contributed 64 out of the 122 accidents which disgraced the railway calendar of the whole Empire.

Again, an electrical means of communication—electrical, because in no other way can an instantaneous and certain signal or message be conveyed—should be established, in the case of trains running long distances, between the driver and the guard. I now proceed to describe the system by which the four essential conditions which I have laid down are and have been secured. On the South-eastern, the personnel of the signal box or station consists not merely of the ministering, but also of the recording angel. The signal man, especially selected for intelligence and paid good wages, is accompanied by a youth who must understand, having been carefully taught, the use of the telegraph, signal and speaking instruments, who records, with the clock before him, the exact time of all signals given or received.

The signal box is specially constructed and placed so as to give a full view of that line and outside signals. It is made comfortable and warm; it is well lighted at night; it contains a clock, the telegraphic instruments, the levers of the points, connected with the signals by the locking apparatus, and is furnished with a box of fog signals, and with hand signal-lamp and signal flags.

—An agreement of consolidation between the Peninsular Railroad of Michigan, the Peninsula Railroad Company of Indiana, and the Peninsula Railroad Company of Illinois, under the name and style of the Peninsula Railway Company, with a capital stock of \$4,000,000, has been filed in the office of the Secretary of State of Illinois.

Collections of Internal Revenue for 1870 and 1871.

A comparative statement, showing the collections of internal revenue for the fiscal years ended June 30, 1870 and 1871, has been completed. The entire amount of collections from spirits for the year ending June 30, 1870, was \$55,606, and for the past fiscal year, \$16,282,463. There was an increase of \$800,000 from spirits distilled from fruits during the past year, and a decrease of \$9,000,000 from spirits distilled from materials other than fruits. The per diem tax on distilleries also decreased \$200,000, and the special tax on distilleries \$800,000. The revenue from tobacco during the past year was \$33,578,587, and for the year before \$31,350,707—an increase of over \$2,000,000, about equally divided between cigars and chewing tobacco. In fact there was an increase of revenue upon every article under the head of tobacco. On fermented liquors the increase during the past over the fiscal year was \$1,070,000, and on banks and bankers the increase was \$623,000. The income tax shows a falling off during the past year of nearly \$19,000,000. The income from individuals for fiscal year ended June 30, 1870, was \$28,224,572, and for the past year \$15,220,462. Bank dividends and undistributed profit for 1870, \$3,573,272, and past year \$1,514,551. Railroad companies' dividends and undistributed profits for 1870, \$2,898,802; past year, \$1,102,018. Railroad companies interest on bonds for 1870, \$1,869,369; past year, \$1,003,477. Insurance companies' dividends and undistributed profits for 1870, \$926,510; past year, \$240,673. All other collections from income for 1870, \$283,437; past year, \$70,745. The revenue from tax on gas was increased during the past year \$260,000. The sales of adhesive stamps decreased \$1,200,000. Articles and occupations formerly taxed but now exempt by act of July 14, 1870, yielded during past fiscal year, \$16,000,000 less than the preceding fiscal year.

TAILINGS TWENTY CENTURIES HENCE—The question of what posterity may be able to accomplish with the refuse of mines of precious metals worked at the present day is suggested by the *Australasian*, in sketching what is now taking place in Attica, in the classic land of Greece. About 300 years before the Christian era, the silver mines of Laurium were exhausted and abandoned; but seven years ago a France-Italian company obtained a concession to treat the scoria and other refuse for silver, and their operations have been conducted on so large a scale that a town containing 4,000 inhabitants has sprung up on what was formerly a solitude; a railway has been constructed to the nearest port, and a small steam vessel plies twice a week between Argosteria and the Piræus for the transport of the argentiferous tailings to the roasting furnaces.

—It is proposed to build the great Southern Pacific road on the three foot gauge. The vice president of the company wrote Henry G. Stebbins, a noted New York capitalist, on the subject, and in his reply Mr. Stebbins says: "In my opinion, it will not be possible to resist the weight of testimony in favor of these railways over any other gauge, and I certainly agree with you, that the discovery of their efficiency will do more for the South and South-west than could have been done by any other human means. I regard the successful agitation of the matter at this time as equal to the discovery and introduction of the cotton gin to the whole Southern section of country."

History of Steam.

About 280 years B. C., Hero, of Alexandria, formed a toy which exhibited some of the powers of steam and was moved by its power.

A. D. 450, Anthemius an architect, arranged several caldrons of water, each covered with the wide bottom of a leather tube which rose to a narrow top with pipes extended to the rafters of the adjoining building. A fire was kindled beneath the caldrons and the house was shaken by the efforts of the steam ascending the tubes. This is the first notice of the power of steam recorded.

In 1543, June 17, Blasco D. Garay tried a steamboat with tolerable success at Barcelona, Spain. It consisted of a caldron of boiling water and a moveable wheel on each side of the ship. It was laid aside as impracticable. A present, however was made to Garay.

In 1650, the first railroad was constructed at Newcastle-on-Tyne.

The first idea of a steam engine in England was from the famous Marquis of Worcester's "History of Inventions," A. D. 1663.

In 1710, Newcomen made the first steam engine in England.

In 1718, patents were granted to Savery for the first application of the steam engine.

In 1774, James Watt made the first perfect steam engine in England.

In 1776, Jonathan Halls set forth the idea of steam navigation.

In 1778, Thomas Paine first proposed this application in America.

In 1781, Marquis Jouffrey constructed one in Saône.

In 1785, two Americans published a work on it.

In 1770, William Tymington made a voyage in one on the Forth and Clyde canal.

In 1802, this experiment was repeated.

In 1782, Ramsey propelled a boat by steam to New York.

In 1788, John Fitch, of Philadelphia, navigated a boat by a steam engine on the Delaware.

In 1793, Robert Fulton first began to apply his attention to steam.

In 1793, Oliver Evans, a native of Philadelphia, constructed a locomotive steam engine to travel on a turnpike road.

The first steam vessel that crossed the Atlantic was the Savannah in the month of June, 1819, from Charleston to Liverpool.

TENNESSEE FINANCES.—The Mobile & Ohio Railroad Company has, through its representatives, paid to the agent of Comptroller Pennebaker the sum of \$1,734,702, being the entire indebtedness, including interest, due from the road to the State. The payment was made in State bonds and past due coupons, and wipes out another million or more of the State's outstanding obligations. During a period of little over a year eleven millions of State bonds have been retired and canceled. This argues well for the future prospects of the State's credit.—*Nashville Union*, Sept. 2.

—The preliminary survey of the Spirit Lake & Sioux Valley (Iowa) Railroad is now being made. The proposed line leaves the Lower Falls & Sioux City road near Storm Lake, in Buena Vista county, passing northward through Sioux Rapids, Spencer in Clay county, Milford and Spirit Lake, in Dickinson county, thence to Jackson, Minn., there to connect with the Jackson branch road, tapping the St. Paul & Sioux City road at Windom.

Railroad Law.

Can a Person with his Arm out of a Car Window, who is Injured by a Passing Train, Recover?

The facts in the recent case of *The Chicago & Alton Railroad Company vs. Pondrum* (51 Ill. 333), are fully and clearly stated in the following opinion by

WALKER, J.—It appears that appellee was a passenger on appellants' road on the afternoon of the 17th of September, 1867, from Bloomington to Chicago. He had purchased a ticket for a first class car, and left Bloomington at noon, and arrived at Chicago at 9 o'clock in the evening on the same day. On approaching Twelfth street, it appears that the train stopped as usual, and appellee swears that he saw a long freight train on the right hand side of the car in which he was sitting. He seems to have been by a window on that side. He seems to have remained in his seat and had his arm resting on the window sill, while the window was open, and he swears that as the train was approaching Twelfth street, his arm was seized by some sharp pointed instrument and was drawn out of the window, and forced back against the rear window frame and was broken just above the elbow joint.

Another witness swears that he was at the time looking at appellee, and that his arm was resting on the window sill, and his hand hanging down on the inside of the car. Neither witness saw what it was that came in contact with appellee's arm. An inspection of the sleeve of the coat worn by appellee at the time, submitted to us by agreement of counsel for our examination, shows, that on the under side of the sleeve, near the lower end, the cloth was considerably broken and torn. The theory of appellee's counsel is, that some iron instrument, protruding from the rear end of the freight train, entered the ear window and came in contact with appellee's arm near the wrist, and pulled or forced it backward until it was fractured above the elbow, the face or side of the window forming the fulcrum. Appellants' counsel contend that his arm was outside of the window and came in contact with some stationary body, by which it was forced backward against the window frame and thus broken.

We are unable to conceive how an instrument could be contrived or formed, attached to the corner of a freight car, that could pass into a window and seize a man's arm near the wrist, hanging down several inches below the base of the window, and not only so, but seize it on the under side of the arm, and hold it firmly and force the arm back, as this seems to have been done. If not impossible, we suppose it is extremely improbable. We can find no solution to the occurrence in that mode, yet this seems to have been the theory of both appellee and the other passenger. If an iron instrument of sufficient length to enter the car far enough to accomplish this purpose had protruded from the rear end of a freight car standing near the track when this train passed, it certainly would have come in violent contact with the front part of the coach in which appellee was riding, and the friction would certainly have been so violent as to have attracted the attention of all persons in the car. Again, the wrist, when the force was applied, from the description of its situation given by appellee and the passenger, must have been at least four or five inches in from the outer surface of the car, and it

may be asked, how it could have passed the forward part of the train and this car without being broken off or bent so that it would not have passed so far into the ear window as to produce the results that it is insisted were thus accomplished.

Nor do we see that it is in the least probable that such an instrument could have been thrust into the window by the backing of the freight train. It is true, that if a spike or bar of iron had protruded backward from the rear of the freight car, and it had been backing at the time, it is not impossible that the iron rod could have entered the window, but it is impossible that it could, after entering the window, some four inches above the wrist, have instantly by its own gravity, curved downward so as to come in contact with the under side of the wrist; and the same may be said if the freight car was stationary. We are, for these reasons, satisfied that the injury was not inflicted in that mode, although appellee and the other passenger no doubt honestly believed that it was. Neither of them saw the instrument that produced the injury, it was sudden, startling and unexpected; they were most probably not observant of all the surroundings and their relations to each other. Not having expected the occurrence, perhaps neither of them was noticing the actual position of appellee's arm at the time of the contact.

While at most, we may, with the facts we have before us, be able to do more than arrive at a reasonable conclusion, still it appears to us that the most natural and probable theory is, that appellee had his elbow resting on the window sill, with his arm extending outward and upward, and in passing the rear end of the freight train, it was so near the passenger car that his wrist came in contact with the corner of the rear ear, and if the speed was sufficiently rapid, the force would be so great that the arm would not be readily withdrawn, and as the pressure increased it would not only force the arm back until it was broken, but it would render the slipping of the arm so difficult, that as it dragged past, it would most likely produce rents in the sleeve, at the place and of the shape found to have been made in the coat sleeve. This, we think, was the manner in which the injury most probably occurred. This, to us, seems reasonable and satisfactory.

The question then arises, whether having the arm casually outside of the car in that manner, was negligence, and if so, was there greater negligence in the company in permitting its freight cars to stand so near the track as to produce the injury in the manner we suppose it occurred; and if both parties were guilty of negligence, was that of appellee relatively slight, when compared with that of appellants? For a passenger to allow his arm to rest on the window sill and slightly project beyond the outside surface of the car, may be, in some degree, negligence, but observation teaches that to do so is not uncommon with passengers. It is frequently done through inadvertence, and when done intentionally, it is upon the supposition that all railway companies have their track free from obstructions, and that they permit nothing to remain so near to the track as would render it dangerous to permit the hand to pass a few inches beyond the outside of a car window.

We have been referred to a number of cases in other Courts, and the earlier cases decided in this Court, as announcing the rule that when there is contributory negligence, the plaintiff can not recover. The established doctrine of this Court is, that where the negligence of plaintiff is slight as compared with

that of defendant, a recovery may nevertheless be had. We are fully aware that it is apparently opposed to the decisions of some Courts, but it is more apparent than real, as recoveries are permitted in those Courts where acts of the plaintiff should be regarded as slightly negligent, not equal to ordinary care; and by requiring the greatest possible precaution on the part of the carrier.

In the case of *Spencer vs. The Milwaukee & Prairie du Chien R. R. Co.* (17 Wis. 487), a case very similar in all of its material facts to the case at bar, the Court say:

"When we consider the manner in which railroad cars are usually constructed—with windows so that they can be opened, and arranged at a sufficient height from the seat, so that passengers will, almost unconsciously, place their arms upon the sill for support—there being no bars or slats before the window to prevent their doing so—then to say if a passenger's arm extends in the slightest degree beyond the outside surface, he is wanting in proper care and attention, and if an injury happens he can not recover, because his conduct must have necessarily contributed to the result, appears to us to be laying down a very arbitrary and unreasonable rule of law.

"It is probably the habit of every person, while riding in the cars, to rest the arm upon the base of the window. If the window is open, it is liable to extend slightly outside. This we suppose is common habit.

"There is always more or less space between the outside of the car and any structure erected by the side of the track, and must necessarily be so, to accommodate the motion of the car.

"Passengers know this, and regulate their conduct accordingly; they do not suppose that the agents and managers of the road suffer obstacles to be so placed as to barely miss the car while passing. And it seems to us almost absurd to hold that in every case, and under all circumstances if the party injured had his arm the smallest fraction of an inch beyond the outside surface, he was wanting in ordinary care and prudence."

In the case of *Luing vs. Colder et al.* (8 Penn. State R. 479), it was held, that a person traveling on a railroad car, who permitted his hand to extend outside of the window, and thereby had his arm broken in passing a bridge, could not recover if the agents of the company had given timely notice of the danger which the plaintiff might have avoided. It will be observed, that this case turns upon the fact that notice had been given to the passenger not to put his hand outside of the window. Had the notice not been given, we may infer, the Court would have held the company liable.

In the case of *The New Jersey Railway Co. vs. Quinard* (9 Harris, 203), the same Court say, that "a carrier of either goods or passengers is bound to provide a carriage or vehicle, perfect in all its parts: in default of which he becomes liable for any loss or injury that may be suffered, provided, it happened without negligence or misconduct on the part of the party injured. A carrier of passengers is bound to omit no precaution that may conduce to their safety. He is bound to guard against every apparent danger that may beset them. The dangers incident to traveling in railway cars are few in comparison with those incident to other modes of traveling; but the most prominent of them is risk of injury to limbs stuck out of windows, where the cars are not so constructed as to prevent it. Anyone who has traveled by railway must have observed that even the most careful passengers forget

the risk, and unconsciously suffer their elbows to slip out beyond the window sill. What can a carrier do to prevent it? no more is required than a few metallic rods set in the windows perpendicularly or horizontally, or a netting of wire work, or even wooden slats. None of these would materially impede the circulation of air, or materially abridge the comfort of the passengers, while it would make their safety sure. A car without any of these appliances, is, to coin a phrase, not roadworthy, and a carrier is responsible for any loss that may happen from that cause alone. Risking his passengers in an unsafe car, it behooves him to use every means in his power to guard against danger from it at dangerous places, by audibly proclaiming in the car the necessity of keeping arms and heads inside. Should any one disregard such warning, he would incur the charge of willful neglect of his own safety, and where there is negligence on both sides, neither party is answerable for any injury from it."

We are aware that this last case has been overruled by the case of *The Pittsburg & Connellsville R. R. Co. vs. McClurg* (Law Register for March, 1868). But we think the former case the better considered of the two, and to be based on sounder reasons and more in harmony with the analogies of the law, and entitled to more weight.

But even if it were to be conceded that it was negligence on the part of the appellee to have had his arm outside of the car window, should he be precluded from a recovery? Was it negligence on the part of the railway company to permit cars or other heavy or permanent bodies to stand so near their track that cars in motion must pass within a few inches of such bodies? We suppose it to be a clear and undeniable duty of a railway company to keep its track clear of such obstructions; and a failure to do so is gross negligence. With such objects so nearly in contact with cars running at a high rate of speed, life must necessarily be endangered; and when such negligence as appellee may have been guilty of is compared with the negligence of permitting a freight train to stand so near the track of a passenger train as to produce the injury which did occur, the former is slight, and the latter is gross. And it has long been the settled law of this Court, in such cases, to compare the negligence of both parties, and even if the plaintiff is guilty of negligence, which is slight as compared with that of the defendant, he may recover. *St. Louis & Alton R. R. Co. vs. Todd* (36 Ill. 409). This case, besides a large number of others in our Court, announce the rule, and notwithstanding other Courts have adopted and acted upon a different rule, we regard it as firmly established in this State.

But even under the contrary rule there are authorities of weight which would justify us in holding that the protrusion of appellee's hand through the car window was not negligence, and that permitting freight cars to stand so near the track for passenger cars was gross negligence. In the case of *Spencer vs. The Milwaukee & Prairie du Chien R. R. Co.* (17 Wis. 490), it was held, where a passenger, while the train was passing over a bridge, had his arm outside of the car window, and it came in contact with a brace in the bridge which had become loosened and dropped downward, and the hand was injured, there was not negligence on the part of the plaintiff, while there was on the part of the company.

An examination of the instructions given in this case, shows that the rules announced

and applied by this Court in reference to negligence, were fairly stated to the jury, and could not have misled them; and the evidence sustains the verdict.

The verdict found and returned by the jury was, no doubt, excessive, but the Court below required appellee to remit all but \$2,500, or he would grant a new trial. The appellee did, and the Court rendered judgment for that sum. While the verdict, after the *remititur* was entered, was still large, we are not prepared to say that it is so far excessive as to require the judgment to be reversed. It is not so large as to strike us that it could only be the result of passion, prejudice or mistake.

The judgment of the Court below is affirmed. Judgment affirmed.—*R. R. Journal*.

How far Railway Companies are Liable as Carriers of Goods Marked C. O. D.

The facts in the recent case of *The Chicago & North-western Railway Company vs. Merrill* (48 Ill., 425), are fully and clearly stated in the following opinion by

LAWRENCE, J.—This was an action of assumpsit brought against the railroad company to recover for the value of some castings sent over their road from Geneva to Winnebago in this State. The goods were marked as follows: "John L. Page, Winnebago, goods by R. R. cars, care of American Express Company, C. O. D.," and were shipped by the railroad with the directions thus marked on them. They were safely delivered to Page upon the freight. He proved insolvent, and Merrill the consignor having failed to recover the price of his goods from him, has brought this suit against the company and recovered a verdict and judgment in the Circuit Court.

There is no possible ground upon which this judgment can be sustained upon the record before us. We held in the case of the *American Express Company vs. Lessem*, (39 Ill. 313,) that in an action against an express company, the plaintiff might aver in his declaration, and prove upon the trial in what sense the characters were used in the business of express companies and what was the usage of those companies in regard to packages thus marked; and what responsibilities assumed by giving a receipt with those characters written upon it. But in the case at bar, although the goods were marked C. O. D., the receipt given by the company contained no such characters, nor any language indicating an undertaking on the part of the company to collect from the consignee the price of the goods. Not only that, but there is not a scintilla of evidence in the record that this railway company ever undertakes the duties of a collecting agent, or that it recognizes the characters C. O. D., when inscribed upon an article of transportation, as imposing upon itself any additional duties or obligations.

And not only was there an entire absence of evidence showing such usage, but the direct reverse was positively proven. Besides all this, it was also shown that no bill for the price of the goods was delivered by the consignor to the company, so that, if it had desired to collect their value from consignee upon delivery, it had not the means of doing so.

Under these circumstances, we are utterly unable to see upon what ground the liability of the railroad company can be made to rest. It simply undertook by its receipt to transport these goods to Winnebago, and there safely deliver them to John L. Page, who is

named in the receipt as consignee. This it did, and there its liability ended. It is true on the box was written besides the name of Page as consignee, the words "care of American Express Company." But in the receipt given to appellee by the company, Page was named as the consignee, and nothing is said about the express company, and we understand these words upon the box as merely indicating that if Page the consignee could not be found to receive the goods, the appellant might deliver them into the care of the express company. But Page did appear and claimed the goods, and the appellant delivered them to him as was his duty to do. And if it could be held that the express company and not Page should be regarded as the consignee of the goods, it appears that the station agent of the railway company at Winnebago who received the goods was also the agent of the express company, so that in either event the appellant made a proper delivery. The judgment must be reversed.

The Mont Cenis Tunnel.

The latest advices represent that the Mont Cenis tunnel has been formally opened, and that the trains are regularly sent through it. Good ventilation is well established, and if it should be found insufficient, the compressors so long employed in the work of excavation, and which have been now idle for so long a time, can be used at both ends. The heat is not excessive; before the completion of the work it did not exceed 82 or 84 degrees, and since the piec g was completed the temperature is so moderate that the workmen have no longer necessity for working stripped to the waist, the through draught of air creating a decided ventilation in the tunnel. There have been some reports that the tunnel is unsafe. It was said that the arch had fallen in for a length of 170 feet; it was affirmed that the heat in the tunnel was insupportable, and that engine drivers had been suffocated from the smoke of the locomotives.

Engineering states that there has never been one stone displaced from the finished arch of the Alpine tunnel, the work of which is so solidly constructed that it is well nigh as durable as the rocks themselves. The only circumstance which served as a formation for these absurd reports was the falling in of eighteen or twenty feet of work, which happened in the last days of June at the Bardonecche end, in consequence of the falling of some scaffolding broken by the explosion of a blasting charge.

The total cost of the tunnel is represented to be some \$13,000,000, or 65,000,000 francs; of these 20,000,000 francs are to be contributed by the Victor Emanuel Railway, or Railway of Northern Italy. This sum is to be paid on or before the opening of the tunnel. The French Government was to pay 19,000,000 francs if the work was accomplished within twenty years, reckoning from 1862. But if the work was accomplished at an earlier date, France bound herself to pay 500,000 francs more for every year gained upon the stipulated time. As there have been eleven years thus gained, France will have to pay 5,500,000 francs besides the 20,000,000 francs of the original stipulation. She has besides to pay 5 per cent interest on the money due for the work as it proceeded from year to year. Thus Italy will pay something less than 20,000,000 francs. Had the construction of the tunnel continued beyond the stipulated term of twenty years, Italy would have lost 500,000 francs for every year in excess of that period.

Heavy Naval Ordnance in Europe.

The seemingly irrepressible conflict between ordnance and armor, which for the last ten years has been waged with changing fortune and doubtful ascendancy, appears now to be no nearer a final settlement than at its beginning. True, the unsatisfactory results given by the 35 ton gun in England, and the problematical efficiency of the Devastation class of iron clads, appear to have established for a time a limit to the absolute power which can be utilized by either the attack or defense in naval warfare; still, development of new systems, and elaboration and perfection of old ideas, now quite as fully as ever afford the ordnance officer a constant field for study.

It will be remembered that when the French Government first put afloat the ironclads *La Gloire* and *La Normandie*, England met the encroachment on her position as mistress of the seas by bringing out the *Warrior* and *Black Prince*, armed with heavy, smooth bore, cast iron guns, which were believed to possess sufficient power to destroy their probable adversaries. The *Magenta* and *Solferrino* followed, calling out the 100 pounder breech loading Armstrong rifled guns of wrought iron; while our war, with its monitors and well tried 15 inch ordnance, after long competitive experiment, developed the composite—steel and wrought iron—Woolwich system of muzzle loading rifled guns, ranging from seven to twenty-five tons in weight, and varying in caliber from seven to twelve inches.

Thus England was forced to adopt built up rifled guns for her armament in order to preserve the power and prestige of her fleet, first by the action of France, and subsequently by the sudden increase of our naval strength. All Europe has coincided in the conclusion that guns of this type—built up rifles—are alone equal to the requirements of modern ordnance; yet this concurrence in a general principle by no means ends the contest or hegets harmony of details, the questions of material, character of rifling, and system of loading being still subjects of warm controversy.

England has adopted muzzle loaders using studded projectiles, and having as an inside structure an oil-tempered crucible steel tube, whose walls, two-ninths of a caliber in thickness, are surrounded by one or more jackets of coiled wrought iron. France relies upon a breech loader also firing a studded projectile, the tube of the gun (walls one caliber thick) being of cast iron, with encircling hoops of puddled steel; while Russia and Germany adopt the Krupp gun—a breech loader employing a lead coated projectile, the sides of the inner tube of the piece, of tempered crucible steel, being eight-tenths of a caliber thick, and surrounded by one or more sets of rings of the same metal.

The remaining naval powers of Europe have accepted one or the other of these rival systems. As will be observed, steel plays an important part in the construction of them all, and is recognized as the material possessing in the highest degree the quality of resisting the violent concussion brought to bear upon the gun when discharged, and presenting not only the most continuous resistance to pressure, but also to the corrosive action of the gases developed.

The question of gun structure is simply one as to fitness of certain materials to resist dynamic strain, and the most suitable for this work is that which offers the greatest resistance through the greatest space. That low steel, with an average elastic limit of over 60,000 lbs., whether prepared by oil temper-

ing, as in Russia and England, or by annealing, as in Germany, possesses the happy combination of what is desired—viz., great elasticity, united with sufficient hardness to prevent erosion—can scarcely be questioned by those familiar with the records of European practice grounds, not one of the built up pieces of homogeneous steel having failed, although some have withstood 1,400 fires with hattering charges. Now that the mechanical problem of producing sound homogeneous masses of steel, of even greater magnitude than is likely ever to be required for ordnance purposes, has been practically solved by Krupp and others, the only powerful objection heretofore urged against this material as a gun metal seems to have been met.

This country does not possess any establishments capable, like that of Krupp, of turning out steel work of any size and in any quantity. Our crucible steel works are still extremely limited both in number and capacity, and were we to begin now the construction of such works, it would be long before we could get them in operation. There is no branch of metallurgy which is so absolutely dependent upon the skill of the workman as steel making, and it would be long before our manufacturers could train or import any considerable number of men for the work, and still longer before they could free themselves from the absolute bondage which a small and necessary class of men always imposes upon its employers. Nor could manufacturers be easily found who would undertake the task here of setting up works here, for the crucible method of making steel is looked upon as one of those processes destined to be supplanted by the progress of metallurgy. There are already works in Sweden where razor steel is made by the Bessemer method, the decarburization of the charge being arrested at the proper point, and no *speigel* used. For all these reasons it appears evident that if we adopt steel guns in our service, we must for a long time at least draw either the material or the finished guns from foreign manufacturers.—*Army & Navy Journal*.

SODIUM AS AN EXPLOSIVE—Recent experiments by European scientists show that in the explosion of sodium the force exerted is by no means small, as may be inferred from the following: 46 grms. of sodium and 18 grms. of water yield 2 grms. of hydrogen, a bulk of 22,471.9 cubic centimeters. The space required for the sodium only amounts to 44.7 c.c. (the water is contained, previous to its coming into contact with the sodium, in a small bulb, which is solidly fixed by means of a neck to the bulb wherein the sodium is contained, which latter may be made of 50 c.c. capacity.) Taking 50 c.c. for the capacity of the explosion bulb, the pressure of the gas generated inside will be 450 atmospheres, equal to 6,800 lbs. to the square inch.

During the last fiscal year the United States produced 30,439,250 pounds of smoking tobacco, 64,656,875 pounds of chewing tobacco and snuff, and 1,319,675 thousands of cigars. During the same period there were imported 8,304,980 pounds of leaf tobacco, and 789,962 pounds of cigars.

Russia imported in 1868, and does nearly every year, about 38,000,000 roubles worth of raw cotton. But, strange to say, none of this cotton comes from the United States, and the cotton mills of Moscow and St. Petersburg, which run from six to seven million spindles, are almost exclusively fed from the fields of Egypt, Brazil and India.

Railroad Items.

—At the hearing of the suit for an injunction prohibiting the lease of the property of the United Railroad Companies of New Jersey to the Pennsylvania Railroad Company, John P. Stockton, Esq., arguing against the injunction, made the following points:

1. There is no charge of fraud, and the question of the wisdom or expediency of the proposed lease is, I submit, one neither for the court nor counsel. As a large majority of the board and two thirds in interest of the stockholders favor it, the probability is that as a pure financial movement it is a good one.

2. The question of the power of the Pennsylvania Railroad to take the lease I do not deem properly before us, nor can it be properly argued at this time for two reasons, which will appear in the course of my argument.

3. I do not consider the question whether compensation has been "first made" in the act of 1870, whether the meaning used in the Constitution is a question in this case, as I hope to make it appear that there is no property "taken."

The closing argument in the suit for an injunction was made at Trenton on the 21st by Judge Black, of Pennsylvania. The opinion of the court was reserved till the October term.

—The *Philadelphia Post* says: "The Pennsylvania Railroad Company use on the main line, between that city and Pittsburgh, 482 engines, 693 passenger cars, 6,632 freight cars, 731 coal cars, 96 baggage, mail and express cars. These are the property of the Pennsylvania Company. In addition to these there are now on the road, 4,877 eight-wheeled cars not owned by the company. The road crosses 150 iron bridges, the total length of which is 13,960 feet; thirty-nine wooden bridges, with a total length of 8,977 feet, and seventeen stone bridges of 24 feet span and upwards. It penetrates 8 tunnels, the shortest one being 200 feet in length, and the longest 3,612 feet.

—Narrow gauge railroads appear to be gaining favor, not only among railroad men, but with capitalists. The securities of these roads are eagerly sought after, and are now in many cases commanding a premium. While broad track bonds are selling all the way from 60 to 85, the narrow gauge is in the 90s, at par, and in some instances at a premium. In Canada, they have about 400 miles of narrow gauge road in process of construction, with grades of 104 feet and curves of 350 feet, with 40 pound rails. The means of these roads are 20 year bonds at 6 per cent. They have thus far been sold at 100 to 104. And these bonds are mainly city and township bonds along the lines of the roads.

—There are 450,000 miles of telegraph wire in Europe, 180,000 in America, 14,000 in India and 10,000 in Australia. There are in addition 30,000 miles of submarine cable, and yet telegraph extension throughout the world is going on at the rate of 100,000 miles of wire per annum. The development of submarine telegraphic communication is at present a matter of serious interest and consideration. Its construction is costly, and the laying of it is hazardous; while the amount of business, especially in the Indian and Pacific Oceans, is not so large as might be wished.

NEW YORK RAILWAYS.—The Albany *Argus* prints some interesting figures on railroads from the report of the State Engineer: The number of roads operated by steam is 164; capital stock paid in, \$234,225,159; total cost of construction and equipment, \$249,224,896. The length in miles of the steam roads is 7,166. Length of roads laid, 4,773. Number of first class passenger cars, 1,229; of freight cars, 35,031; number of passengers carried, 24,550,753; number of miles traveled, or number of passengers carried one mile, 912,626,984. Total freight, or number of tons carried one mile, 2,654,146,549. The total earnings amount to \$69,549,444. A great deal is said about railroad accidents, and the danger attending travel on railway cars. The results of 1870 show that 15 passengers were killed by accidents. The average number of miles traveled for each passenger killed was 669,841,798.

—Several more suits have been filed against the North Missouri Railroad Company—one by James Low, for \$100,000 due in promissory notes, drawn in favor of the St. Charles Bridge Company and several individuals; one by E. W. Fox on a note for \$23,000, and one by George D. Humphreys for \$14,000.

THE RED BLOOD-GLOBULE.—Dr. Richardson, of America, who has lately been inquiring into this subject, publishes some observations in the *American Medical Times*. He alludes briefly to one of the minor points among his observations, which doubtless has been overlooked—viz., that recorded to the effect that blood crystals of the Membranchus, when partly dissolved, and as if with perfect freedom, in various directions, between the nuclei and external borders of certain corpuscles. This fact appears to his mind much more consistent with the hypothesis of a cell wall inclosing fluid contents than with the doctrine of a homogeneous jelly-like constitution (Beale), or the theory of a crystalloid element "contained in an albuminous framework of prazglobulin" firm enough to preserve the shape of a red disc (Brücke, Striker); and it seems to him the indications furnished by this circumstance resembles in kind the evidence which sudden dartings of a goldfish across his vase would be that he was not embedded in jelly or entangled in a net. Fully recognizing, however, the wisdom of caution against considering any one series of experiments (or, he may add, indeed, any one man's unaided observations, however numerous) as "conclusive proof," and trusting, therefore, that these researches will lead others to investigate the subject and correct or confirm his results, he concludes his observations.

TRACING PAPER.—The Engineering and Mining Journal says that artists, architects, land surveyors, and all others who have occasion to make use of tracing paper in their professional duties, will be glad to know that any paper is capable of the transfer of a drawing in ordinary ink, pencil, or water color, and that even a stout drawing paper, can be made as transparent as the thin yellowish paper at present used for tracing purposes. The liquid used is benzine. If the paper is dampened with pure and fresh distilled benzine, it at once assumes transparency, and permits of tracing being made, and of ink or water colors being used on its surface without any "running." The paper resumes its opacity as the benzine evaporates, and, if the drawing is not then completed, the requisite portion of the paper must again be dampened with the benzine. This new discovery of the properties of benzine will prove of service to the art profession, in allowing the use of stiff paper where formerly only a light tissue could be used.

THE PROCESS OF SILIFICATION.—At a recent meeting of the Geologists' Association a paper was read on the "Origin of Flints." After alluding briefly to the different modes in which these substances occur, Mr. H. Johnson proceeded to show that their formation is due to a chemical process which may be roughly expressed, in technical language, as the substitution of silica for carbon. He pointed out how a crop of sponges invested with their gelatinous fish or sarcod, and living at the bottom of a deep ocean, were suddenly buried in a thick stratum of white mud, consisting of the minute shells of *Foraminifera*; that they then died, and while in the process of decomposition, this interchange of materials took place—the nascent carbonic acid parting with its carbon in exchange for the silicon of the silicate of soda which sea-water is known to contain. At the close of the paper, the author produced a tadpole, upon which he had experimented, and which he had that afternoon subjected for two hours and a half to the action of nitric acid, without its undergoing any alteration, the inference being irresistible that the animal had become invested with a film of silica of sufficient thickness to protect it from the acid; another tadpole that had not undergone the same preparation having been converted into a brown cloud by immersion in the acid for the same time. The importance of this discovery in connection with the arts can scarcely be over-estimated; for the protection of perishable surfaces from decomposition is a desideratum that forces itself upon our notice daily.

TAPIOCA PAPER.—To prepare this paper, which is very useful for copying photographs by artificial light, 200 grammes of tapioca are soaked for two days in an equal weight of water; 10 litres of water are added, and afterwards, for every litre of liquid, 10 grammes iodide of potassium, 30 grammes chloride of potassium, 1 gramme bromide of potassium, are dissolved, and the whole boiled for ten minutes, allowed to stand for a day, and decanted and filtered through fine linen. The paper immersed in it 12 to 20 sheets at a time—or can be floated upon it—for 15 to 20 minutes; it is then hung up to dry in a dark room. If it has assumed a dark color, that is of no consequence, as it disappears in the silver bath. This is to be prepared in the proportion of 1.15, and for every ounce of nitrate of silver 50 to 60 grains of citric acid to be added. The developer is made of 50 grains of pyrogallie acid and 80 grains citric acid in 30 ounces of water. The time of exposure varies from 10 seconds to 25 minutes, according to the picture to be copied and the actinic force of the light.

PAINTING IRON WIRE NETTING BLACK WITHOUT USE OF BRUSH.—Prepare a mixture of tar (previously well boiled on caustic lime), turpentine, and boiled oil; carefully heat, so as not to set fire to the turps, stirring the while. When nearly boiling put into a vessel large enough to allow the wire netting in coils, and free from dust and dirt, to be dipped entirely. Now dip, lift up and shake, dip again, repeat, till no air bubbles can remain.

—Regular trains commenced running on the Peninsular Railroad of Michigan between Lansing, Michigan, and South Bend, Indiana, on the 11th inst. The Peninsular connects at Charlotte with the Grand River Valley Railroad; at Battle Creek with the Michigan Central; at Brady with the Grand Rapids & Indiana; at Schoolcraft with the Kalamazoo Division of the Lake Shore & Michigan Southern; at Cassopolis with the Michigan Air Line, and at South Bend with the Lake Shore & Michigan Southern.

RAILROAD NOTICE.

The Cincinnati & Great Northern Railroad Company.

The undersigned Corporators of the Cincinnati & Great Northern Railroad Company hereby give notice that more than ten per centum of the capital stock authorized by the Articles of Association of said Company has been subscribed to-wit: eight thousand eight hundred and twenty (8820) shares; and the said Corporators therefore give notice for the said stockholders to meet at the office of the Railroad Record, No. 167 Walnut street, Cincinnati, Ohio, on Saturday, the 30th day of September, A. D. 1871, at 11 o'clock A. M. of said day, for the purpose of choosing seven directors of said Company. A full attendance is requested.

A. J. HODDER,
DURBIN WARD,
T. WRIGHTSON,
S. W. MORTON,
ROBT. HEDGER,
Corporators.

CINCINNATI, O., Aug. 30, 1871.

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H. J. BOND, Gen'l Agent,

22 West Fourth Street,

CINCINNATI.

The Railroad Record.

E. D. MANSFIELD, - - - - - } Editors
T. WRIGHTSON, - - - - - }
A. J. HODDER, - - - - - }

CINCINNATI, - - THURSDAY, OCTOBER 5, 1871.

The Railroad Record,

PUBLISHED EVERY THURSDAY MORNING,

By Wrightson & Co.,

OFFICE—No. 167 Walnut Street

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Railroad Experience, and Some Deductions therefrom.

In two or three articles recently, we have arrived at some of the practical results of railroad working in this country, and the encouragement which railroad owners and bondholders may derive from it. We shall continue this subject so as to give a clear view of what has been the result of railroad experience, and what may be confidently expected in the future.

1. Increase of Railroads.—

Year.	Miles in operation.
1835.....	1,098
1840.....	2,818
1845.....	4,633
1850.....	9,021
1855.....	18,374
1860.....	30,635
1865.....	35,085
1870.....	52,000

We have divided the time into periods of 5 years each, in order to cover any casual differences from year to year, and thus show the general rate of progress. It will be seen that in only one of these periods, that from 1860 to 1865, did the rate fall off materially, and that was the period of the war. In that period, little progress was made, and little was to be expected. For twenty years, from 1835 to 1855, the number of miles of railroads doubled each five years. Since 1855, except in the period of the war, the rate has been in each five years 70 per cent. From 1865 to 1870, the rate was 50 per cent. But, from 1865 to 1870 the increase of population was only 15

per cent. We see, then, that the rate of railroad progress has been treble that of population. From this we deduce an important conclusion, that railroads do not yet come up to the demands of the country, and therefore railroad progress will continue at the present rate for some years to come. We do not speak, of course, in reference to such States as Massachusetts and Connecticut, which are small States, very populous, and soon made nearly all the roads they need, but we speak of the general average of the country, which will probably be attained in the central States, but he much surpassed in the States west of the Mississippi.

2. *Cost of Railroads.*—There is an incompleteness in the returns of many companies: but the aggregate returns of 1870 were, in round numbers, 52,000 miles of railroad, \$2,200,000,000 of cost. This gives a cost of \$42,300 per mile. In populous States, with large towns, the right of way and the cost of material being greater, the average cost of roads will be greater. In such States as Ohio, Indiana, Illinois and Michigan, the average is not more than \$40,000. In the new and Southern States the average is much less.

3. Roads to be made, and Capital required.

—Diminishing the ratio of progress from 50 per cent in 1865-70 to 38 per cent, there will be made 20,000 miles of railroad from 1870 to 1880. As the last year of railroad construction gave 6,000 miles, it is evident that, without an intervention of Providence against it, there will really be much more, probably double. But we make our estimate on the actual figures before us. Past experience shows that the ratio of increase gradually declines; so reduce it from 50 to 38 per cent., which gives 20,000 miles increase from 1870. At \$42,300 per mile, this will require \$846,000,000. Now we have shown in a previous article that the dividends on stocks of all kinds, after making sufficient allowance for consumption furnish \$200,000,000 per annum for reinvestment. This gives \$2,000,000,000 in ten years, or \$1,250,000,000 more than will be needed for railroad investment. In other words, the railroads will ask for \$84,600,000 per annum, and there will be actually \$200,000,000 in the markets. The probability then is that there will not only be enough capital for all the new railroads to come, but that capital will seek such investments at lower interest. In fact, we expect that the time is near at hand when the interest on money will be much lower, and railroad stock be deemed the best investments in the country.

4. *Increase of Tonnage.*—By railroad reports, and especially the returns of such States as New York and Pennsylvania and Massachusetts, we are able to get very nearly the amount of tonnage carried on the railroads. Deducting a large per cent. for duplications, we have these results:

Year.	Tons.
1858.....	18,000,000
1867.....	75,000,000
1870.....	100,000,000

We see, then, that since 1858, the tonnage of railroads has increased 450 per cent. But the number of miles of railroad increased but 150 per cent. We can not here go into the reasons of this, but the reader will easily understand, if he reflects, that the areas (and therefore the products carried) drained by a railroad increases at a much greater ratio than the increase in miles of road. For example, if a railroad was 10 miles long, and the tonnage carried is represented by 100, then if the road is 100 miles long the tonnage carried will be represented by 10,000, because these are the squares or areas drained respectively by 10 and 100. This would make 100 fold; but we must recollect that this very fact makes competition, so that the road which now made 100 miles (instead of 10) soon encounters the competition of another road 30 miles off. But the principle holds good to an extent we see of increasing the tonnage 450 per cent, while the roads increased 150 per cent.

5. Increase of passengers.—

	In 1853.	In 1870.
New York.....	11,563,000	19,100,000
Six roads in Ohio...	1,470,000	3,259,000

Aggregate 13,033,000 22,359,000

In 12 years, then, the number of passengers on about 5,000 miles of railroad increased 9,000,000, which is 75 per cent. That is, the number of passengers increased at the rate of 6 per cent. per annum. This is far below the increase of tonnage. The reasons for this we shall give in another article. In the meanwhile we have given enough in this to excite the attention of every thoughtful mind. In another article we shall add something to this. In the meanwhile, we may conclude that railroad investments are safe, and are probably the best which can possibly be made at this time.

CINCINNATI & GREAT NORTHERN RAILROAD.—

The following gentlemen were elected directors of the above company, on Saturday, the 30th September: Col. S. W. Morton, Gen. J. C. Fremont, Judge J. C. McKeamy, Jas. T. Brady, Esq., Hon. F. C. Le Blond, Gen. Durbin Ward, W. A. Weston, Judge A. S. Latta, Davis Johnson, A. J. Hodder and H. D. Faulkner.

At a subsequent meeting of the Board, Col. S. W. Morton was elected President; Jas. T. Brady, Esq., of Pittsburg, the Treasurer, and Hon. T. Wrightson, Secretary.

The St. Louis Railway Register is a new addition to railway literature, and will, we trust, fill a vacuum long felt of an organ especially devoted to railway interests in that great and growing city. We wish it long life, and a usefulness as extensive as the broad field commanded by the city of its birth.

Cincinnati & Great Northern Railroad.

This company was fully organized by the election of a board of directors on Saturday last. We have previously alluded to its primary organization, and indicated some of its objects.

We understand that a through line, one terminal point resting on the waters of the Ohio, at Cincinnati, and the other at the gateway of the lakes, the straits of Mackinaw, is the intent and full purpose of the organization.

The route, as all through lines should be, is to be as near an air line as the topography of the intervening country will admit of; Greenville, Darke county, being a point, with Lansing, the capital of Michigan, another. This will carry it through the Western tier of counties in Ohio, now entirely devoid of railroad facilities, except such as are afforded by the East and West lines. These lines, of course, now carry whatever there is of traffic away from Cincinnati, while the new line will bring it directly to our door, in a controlling manner.

The Cincinnati & Great Northern will traverse and develop this tier of counties, constituting fully one-tenth of the entire State of Ohio, unexcelled if equaled in agricultural wealth, by any other portion of the State, and capable of supporting a very dense population. For the traffic of these nine or ten counties this road will be without a competitor.

We give below a resume of some of the advantages of this road for local as well as through traffic, which we copy from the very able report of the president of the company:

"1. The lumber trade will be immense. Cincinnati must hereafter be supplied with lumber almost wholly from the peninsula of Michigan, and as that grows scarce, from the British dominions. The supply of pine lumber from the upper Ohio valley has greatly diminished and must soon cease, while that from the upper Mississippi is too distant and can not compete at all with that from Michigan and Canada. Already Cincinnati and all the towns in Southern Ohio receive large quantities of lumber from the North. The Miami valley must be supplied from that region, and this traffic alone will soon give employment to one road. It is proved by statistics that the towns of the Miami valley consume one-fourth as much lumber as Cincinnati, and that a growing population of 200,000 requires 100,000,000 feet of lumber. There is double that number now in the Miami country, and half as much more on the Kentucky side, to be reached through Cincinnati. We shall not overstate the matter when we say that 300,000,000 of feet of lumber will be required in the region round Cincinnati, to be brought from the North. It is not long since it was questioned whether railroads could carry lumber; but the experience of the Erie Railroad has completely demonstrated that

The average distance of carrying lumber from the pine region to Cincinnati will be 350 miles, and profitably paid at \$6 per 1,000 feet, which will make \$1,800,000 for the whole amount brought. If we suppose the Cincinnati and Great Northern road carried but half of that, and from its directness it must have a superiority over all competitors, it would receive (counting the whole line) nearly a million dollars from that source.

"2. The distribution of coffee, sugar, cotton, and groceries, to the intermediate country will make another great source of business. The reports of the Chamber of Commerce at Cincinnati show that the imports and exports of these articles at that port have constantly and greatly increased from year to year. The distribution of them is to each section, in proportion to the consumption. After allowing for all possible competition from Louisville and Chicago, it is certain that the whole region from Toledo to Michigan City, and south to Cincinnati, must be supplied from this city; hence the Cincinnati & Great Northern road will have all of this traffic, which lies in its own proper section, without competition. Heretofore that section has been without railroads, but when the Great Northern is made, it will, of course, increase the growth, and therefore the consumption of products, with great rapidity. The traffic for local consumption will therefore be not only great but fast growing.

"3. The distribution of manufactures, especially of iron, wood, and tobacco, will amount to a large tonnage. Estimating by the former tonnage of the canal to Toledo, and the great increase of population since, we think that not less than 40,000 tons of these articles will be distributed by the Great Northern road.

"4. The local traffic in produce from Greenville to Lansing, and only in a breadth controlled by the road, is at least the business of 390,000 people. Estimating their productions as equal to that of the same number of people in Indiana and Illinois, there will be 200,000 tons of surplus produce to be carried off. No doubt there will be competition for this from the Toledo, the Michigan Southern, and the Fort Wayne roads, but it will be within bounds to say that half of this (100,000 tons) will be carried by the Great Northern. The receipts from this source can not be counted at less than \$250,000 per annum.

"5. Local traffic in people furnishes all railroads with a large portion of their business. The experience of railroads shows that the number of local passengers average 60 per cent. of the population. If the population within the influence of the Great Northern from Greenville to Lansing be, as we have estimated, 390,000, then there will be 232,000 local passengers, who will average three cents per mile on half the road, which is 135 miles (it being 270 from Cincinnati to Lansing). This will give in that distance \$765,000. The

rapid growth of the country, which must ensue by the making of this road, will greatly increase this branch of its business.

"From these general considerations it is very evident that if we confine ourselves to the part of the Great Northern between Cincinnati and Lansing, 270 miles, the local receipts only can not fall short of \$2,000,000."

The report further, very truly says:

"The British possessions, as we have already intimated, can not get the productions of the South by the St. Lawrence, or Boston or New York, as quickly or as cheaply as by a direct route from Detroit or Mackinaw to the heart of the South. Already the Grand Trunk Railway of Canada has penetrated the whole length of Canada to Sarnia, at the southern end of Lake Huron, and there connects with the steamers and vessels navigating that great inland sea. Crossing the river at Port Huron, it has proceeded due West 50 miles, till it has reached La Peere. A few miles more it will cross the line of the Cincinnati & Great Northern road. Thence to Cincinnati only remains to complete this line, we have described from Greenville to the State line of Michigan, in order to connect the whole railroad system of the Dominion immediately with Cincinnati. The effect, then, of completing the Great Northern in Ohio will be to make it a great through route connecting the British Dominion with our Southern States. The magnitude of such a traffic can scarcely be imagined."

We have long and persistently contended that a great axial line from the Straits of Mackinaw, passing through Cincinnati to Pensacola, or Charleston and Savannah, was one of the leading necessities of the country. That this ideal line was and is regarded by the citizens of Cincinnati as an important one, is fully evidenced by their acts in reference to the Cincinnati Southern Railway, which would form a portion of the great route from the gulf and the ocean to the lakes. Sooner or later the whole line will be completed.

The character of the traffic on such a line may readily be calculated, as it will pass through fifteen degrees of latitude; but its magnitude, passing as it will through the great interior basin of the country, and parallel to and west of the great eastern backbone of the continent, the volume of traffic must swell beyond the comparison of other lines. The report in referring to this says:

"In two days any inhabitant on that line may be supplied from their native source with sugar, cotton, corn, wheat, tobacco, iron, coal, lead, copper, pine, cedar; with wool, flour, hemp, and fruits of every description; with fish from the sea and fish from the lakes; with bread, oil, and wines; in fine, with every thing that supports, clothes, or houses men; with every thing which supplies his wants or contributes to his material happiness. Now

we unhesitatingly say that this makes the Cincinnati & Great Northern line far superior to either of the Pacific roads. They with all the East and West lines, pass over the same lines of latitude, and therefore do not and can not furnish an equal amount of the materials of traffic which will be furnished by a North and South line. The entire arterial line, from the Straits of Mackinaw to Pensacola, will not exceed 1,200 miles, which is only half the distance from New York to San Francisco over the Pacific road, and yet we say without any fear of contradiction, that a railroad from Mackinaw to Savannah or Pensacola, will have double the traffic which can pass over the present Pacific road. Just look at it! The whole distance from the Straits of Mackinaw to Savannah (running at the rate of the Pennsylvania road) can be run in (40) forty hours. The northern, the central, and the southern climes will be passed through with only a single night intervening! In two days the citizens of the North or South may traverse sixteen degrees of latitude, six States of the Union, and be carried through all the varieties of products, agricultural and mineral, which the United States produce. This can not be said of any other line of railway in the United States, made or projected. Considering the line as a unit from Mackinaw to Pensacola or Savannah, or New Orleans, it can not be equalled in extraordinary results by any other line in North America."

"Such is the general object and necessary results of a great axial line from the center of the great Northern lakes to the center of the valley of the Ohio and the Southern Atlantic."

The Babcock Fire Extinguisher.

FALMOUTH HOTEL, Portland, Me.
June 23, 1871.

F. W. FARWELL, Sec'y, 122 Washington St.,
Chicago:

Your Extinguishers were very effectual at a fire in this house this morning, which was well under way before discovered, having undoubtedly been burning between two and three hours. The room in which the fire caught is on the fourth story, and when I reached it, all the casing and door was on fire, the partition between the adjoining room was burned, the floor and timbers were more than half burned off, and the fire had spread some distance from where it started.

If it had not been for the Extinguishers, it would have been a very disastrous fire, and the loss by water, through damage to the walls and furniture, would have been very great, whereas now it will cost less than one thousand dollars to put everything in as good condition as before the fire.

Respectfully yours,

P. E. WHEELER.

The Rockport & Cincinnati Railroad.

The Rockport & Cincinnati and the Cincinnati & South-western Railroad Companies consolidated yesterday afternoon, in this city, at a joint meeting of the respective directors. The name and style of the consolidated companies will be the Cincinnati, Rockport & South-western Railway Company.

The officers of the Rockport & Cincinnati Railroad Company are all retained as the officers of the consolidated company.

This action determines Mitchell, Ind., as the north-western terminus, on the Ohio & Mississippi Railroad, of the Rockport road, and prepares the way for the construction of a branch line of road from Mount Vernon, Ind., to Jasper, in that State, which line was embraced in the charter of the Cincinnati & South-western Railroad. This opens up fine country in Posey, Gibson, and Pike counties.

This gives us a seventeen miles shorter route between here and Nashville, than by way of Loogootee.—*Gazette*.

This is the best move that could possibly have been made with the Rockport Railroad. A combination should now be formed with the Cairo & Vincennes line, under the management of Gen. Burnside, and the scheme would then have a merit in it that it has never hitherto possessed. As a general rule, no road can be a success that has not both terminal points at some town or other of importance. Even if this scheme should be carried out, the line would be dependent on the O. & M. for all traffic to or from Cincinnati and eastward. This would put the road at the mercy of the O. & M., and it is a well known fact that the O. & M. and its policy is controlled by interests although not necessarily antagonistic to Cincinnati, yet they have no special motive to discriminate in her favor.

The proposed line would have no chance for competition for its traffic from Mitchell eastward, as we have shown, and could therefore scarcely expect to be a paying route, even although the whole line should be constructed.

As to the Nashville connection, it is true, traffic *could* go that way; but as a through line, without consolidation of the lines to the great terminal points, it would be but an empty gut, without the means of alimentation at either end.

We want the road built, it will add to the commercial facilities of the city, but can not believe that in itself it will be a paying institution.

— The first railroad in the Territory, the Denver Pacific, was completed to Denver in June, 1870, and the Kansas Pacific reached this point in August following, since then the value of real-estate has been rapidly advancing. There are now centering here in addition to the above named roads, the Colorado Central and the Boulder Valley; and the cars will soon be running on the Denver & Rio Grande. Other roads are in contemplation, among them a narrow gauge from St. Louis to Denver. This city bids fair soon to become a great railroad centre.—*Col. Monthly*.

Memphis & Charleston Railroad.

REPORT FOR THE YEAR ENDING JUNE 30, 1871.

The president remarks: At our last annual meeting the report for the year ending June 30, 1870, showed a heavy increase of business over that of the preceding year. Our business at that time, and the anticipation of additional motive power, justified us in the hope that we would have an increase of at least ten per cent. for the past year, the first quarter giving us about nine per cent. gain over the corresponding quarter of the previous year.

We feel sure such would have been the case, but for a series of troubles over which we have no control. First, the floods of Virginia, commencing on 30th of September, causing an entire stoppage of their roads for thirty days. This not only occasioned the loss of all Eastern freight and passenger business for one of the heaviest months, but influenced many of our friends to look to other lines, which has affected us materially through the year. The amount of loss to us it is hard to estimate.

This was followed by the effect of the war in Europe, causing such a decline in the price of cotton as to cut off the income of our people to an extent that materially affected our receipts from through and local business, and which accounts for our loss in receipts from passenger traffic, say—

Through passengers.....	\$64,844 43
Local passengers.....	88,726 01

Total.....\$153,570 44

The opening of the Iron Mountain Railroad, the improved condition of the North-western road, and the perfecting of the route via Vicksburg to Montgomery and points east, have caused us to lose largely of the business heretofore derived from St. Louis. Yet our entire loss of freight receipts is only \$19,475 30.

This small decrease is accounted for by an increase of 24,165 bales of local cotton, an increase in local rates for short distances, and the movement of an increase of 46,248 bales of through cotton, which nearly compensated for the loss of St. Louis business, and the cessation of eastern business caused by the Virginia flood.

Our additional equipment enabled us to do this business promptly and gave us as rents received from connecting roads an increase of \$32,837 89, which is a good interest on the amount invested.

We have endeavored to keep our expenses to the lowest point consistent with the proper maintenance of the company's property.

RECEIPTS.

From passengers...	\$665,333 21
" freights	619,182 92
" mail service...	42,891 24
" exp's service	36,000 00
" other sources..	51,034 09

Total receipts.....\$1,417,441 46

EXPENSES.

Operating expenses.	\$894,522 35
Extraordinary "	304,484 21
	1,199,006 56

Net receipts.....	\$218,434 90
Operat'g expenses, 63.011 p c. of gr. receipts	
Gross " 84.059 " "	

Compared with previous year, this shows decrease of 2 14-100 per cent. operating, and

an increase of 4 26-100 per cent in gross expenses to gross receipts. Full receipts would, of course, have made this comparison more favorable.

The amount paid for interest on funded debt, taxes, interest and exchange, etc., is..... \$319,775 26
Amount of deficit from operating road after making all payments for the year..... 101,340 36
The sale of our Selma & Meridian bonds, and amounts realized from other assets, have enabled us to pay this deficit and reduce floating debt..... 95,689 07

ROADWAY.

By reference to the report of the chief engineer in charge of this department, it will be seen that the total cost of

Maintenance of way, proper, is... \$219,170 70
Other items in charge of chief engineer..... 107,046 19
Amount of extraordinary expenses (roadway)..... 75,961 93

Total expenses, eng'rs dept.. \$402,178 82
Same for previous year..... 566,985 75

Showing decrease from prev. year \$164,806 93

The details of these expenditures are fully stated in the report to which we refer.

The purchase of 650 tons of steel rails, referred to in last annual report, has been modified. Steel rails advancing in value, we sold our contract at a profit, and entered into contracts for 1,600 tons of iron rails at lower rates than could have been obtained at the time of contracting for the steel rails. We did not believe that the traffic of the road was sufficient to warrant the difference between the cost of steel and iron. With this 1,600 tons of new iron we propose to replace every defective rail between Stevenson and Memphis, using the new iron in entire sections, and the good rails taken out, to replace had iron elsewhere.

FINANCIAL CONDITION.

Our whole outlay for the past year, including interest and expenses, was \$1,518,781 82. For the next year we estimate that it will range from \$1,300,000 to \$1,400,000, and all receipts above that amount can be used in paying dividends.

CONNECTIONS.

We are gratified to announce the completion of the road to Little Rock, with prospects of its extension to Fort Smith in a short time. There is but little doubt of the building of a narrow gauge road from Devalls' Bluff, via Pine Bluff, Camden and Shreveport, to connect with the Texas Pacific at Marshall, Texas, which will add greatly to our business.

No work has been done in the State of Arkansas looking to our connection with the different roads centering at Springfield, Mo., and but little on the line connecting us with St. Louis.

The South & North Alabama Railroad will be completed in the next twelve months. Under an arrangement with the Louisville & Nashville Railroad, our business is placed upon the same footing as their own, which will be of great value to us, without any outlay on our part. By this line, via Elyton, we trust soon to have a connection with Atlanta. Other Southern connections are spoken of.

The prospect of a connection with the Eastern cities, via Sparta, Tenn., and Cincinnati, is more favorable than heretofore.

Statement of Receipts and Disbursements for the Fiscal Year ending June 30, 1871.

RECEIPTS.

Cash on hand June 30, 1870	\$87,165 50
Gross earnings for year	1,417,441 46
Sale of stocks.....	154,175 00
Amount paid on bills receivable	8,965 83
Sale of coupon bonds	233,000 00
Amount collected of S. Car. R. R.	1,717 99
Decrease in amount due from individuals.....	11,254 66
Sale of Tennessee coupons.....	22,592 38
Sam. Tate, Rec'r, account paid	24,060 48
Increase of bills payable	38,776 80
Increase of amount due State of Tennessee	46,450 00

\$2,045,600 10

DISBURSEMENTS.

Road expenses.....	\$894,522 35
Extraordinary expenses	304,484 21
Interest on State debt.....	121,617 74
Interest on company bonds.....	160,510 00
State and county taxes.....	27,483 40
Interest and exchange account	5,932 08
Suspense account.....	4,232 04
Paid on construction account....	5,425 50
Increase of materials for road....	9,369 15
Sinking Fund, State of Tenn....	34,000 00
Increase of account vs. U. S.	2,367 56
" in amt. due from railroads	22,168 74
" " " agents.....	3,785 68
" in endorsed city of Memphis coupons	3,989 49
Decrease of amt. due banks and bankers	94,392 06
Decrease of amt due on company coupons.....	2,195 37
Decrease of amt. due on pay rolls	1,725 92
" " " on divid'ds	3,906 24
" " " on State int	9,085 86
" " " on U.S. tax	8,550 62
" " " to railroads	41 28
" " " to individ'ls	14,568 52
Difference in profit and loss acc.	234,075 99
Cash on hand June 30, 1871 ...	77,170 30

\$2,045,600 10

Condensed Balance Sheet Eastern and Western Divisions Memphis & Charleston Railroad, June 30, 1871.

DR.

Stock and property	\$386,008 26
Interest and expenses.....	1,518,781 82
Assets	771,054 51

CR.

Floating debt.....	\$469,854 41
Receipts	1,417,441 16

— The Toledo Blade says that the survey for the Baltimore, Pittsburg & Chicago Railroad, is completed from Pittsburg to Havana, a small station on the Lake Erie Division of the Baltimore & Ohio Railroad, eight miles south of Monroeville, Ohio. Thence it is expected, according to the programme now being pursued, the line will run to Defiance, on the Toledo, Wabash & Western Railroad, crossing on its way the Dayton & Michigan Railroad at a point now called Ellsworth. From Defiance it is expected that the engineers will work their way along to Bryan and through Lefrange and Steuben counties to Laporte, Ind.

— Engineers of the Davenport & St. Paul Railroad Company have been examining the country for a route for their road between the north line of Iowa and St. Paul.

CHESAPEAKE & OHIO RAILROAD.—The Huntington Independent, published at the Ohio river terminus of the Chesapeake & Ohio Railroad, speaking of that enterprise, says:

Mr. Carpenter, the Superintendent of track-laying, has three sets of hands at work on this end of the road, and will finish about one mile a day. If no further hinderance interferes, this rate of progress will complete the road from Huntington to the Falls of Kanawha within thirty days. As soon as the cars are running from here to Kanawha there will be a daily line of passenger steamers connecting with Cincinnati, so that passengers can leave Kanawha Falls at dusk, taking supper at Huntington, and breakfast in Cincinnati, transacting their business there, and returning to Kanawha with a loss of only one day's time, making the round trip in thirty-six hours. Among the visitors here this week may be mentioned, C. P. Huntington, President of the Chesapeake & Ohio Railroad; Gen. William C. Wickham, Vice President; H. D. Whitcomb, Chief Engineer; H. C. Parsons, Director, and other officials connected with the road. Also Gen. Breckinridge, Vice President Elizabethtown, Lexington & Big Sandy Railroad; Col. Trimble, President Southern Ohio Railroad; Col. Pryor, Locating Engineer, Huntington & Cincinnati Railroad, (known as the river route); High Means and John Means, capitalists and iron manufacturers, from Ashland, and others. These gentlemen have met here for the purpose of consultation in regard to the proposed western railroad connection with the Chesapeake & Ohio Railroad from this point, and from all the information we can gather the Elizabethtown, Lexington & Big Sandy road is to be built at once. It is also rumored that Col. Trimble's road (the Symms Creek route) has been adopted as one of the connecting routes west. Mr. Huntington expressed himself as very much encouraged at the growth of the city since his last visit, and says that large manufacturing establishments will be erected here soon.

ATLANTIC & ONTARIO RAILROAD.—A meeting of the directors of this proposed road was held on the 21st inst. at Ballston, N. Y., when, the necessary amount \$70,000 having been subscribed, the company was duly organized, and articles of association adopted. The following officers were elected: Col. T. C. Peck, of Ballston Spa, President; L. M. Crane, of Ballston Spa, Secretary; D. Hays, of Johnstown, Treasurer; H. R. Snyder, of Johnstown, Engineer; E. Appleton, of Boston, Consulting Engineer. The road is to begin at a point at or near Eagle Bridge, in Rensselaer county, and run thence westerly through Ballston to Salisbury, in Herkimer county, to a point at or near Oswego. The distance is seventy miles, and the road is to be constructed and eventually owned by Massachusetts capital. The survey is to be at once begun, so as to have the report and all documentary evidence ready to present to the Legislature of Massachusetts this winter. The object is to empty the produce of the great west into Boston, through the Hoosac tunnel, for the completion of which Massachusetts has expended \$7,000,000.—*Albany Journal*.

— It is understood that the Michigan Central Railroad Company will assume control of the Jackson, Lansing & Saginaw Railroad. The transfer of this road to the Michigan Central Company, insures its construction to Mackinaw.

CHIPPEWA VALLEY & LAKE SUPERIOR R. R.—A meeting of the corporators of the Chippewa Valley & Lake Superior Railroad was held on the 11th inst. Upwards of twenty millions of capital from New York alone was represented at the meeting, and the most flattering prospects of a speedy commencement of the building of the road were made apparent by the determined interest manifested on the part of the capitalists present. The action of the meeting resulted in electing as President of the board J. M. Dwight, of Dryden, N. Y., and as directors, J. H. Knight, of Bayfield; T. C. Pound, L. C. Stanley, Chippewa Falls; J. G. Thorp, H. C. Putnam, Eau Claire; S. S. Kepler, Wabasha; H. E. Houghton, Durand; Ezra Cornell, Jno. McCraw, Ithaca, N. Y.; J. M. Dwight, Dryden, N. Y.; Thos. McGraw, Dean Sage, Albany; H. W. Sage, W. H. Sage, A. B. Cornell, New York.

The general belief here is that the road will be built between Eau Claire and Chippewa Falls the present fall, and supplied with rolling stock. The only barrier to the speedy commencement of the grading between here and the Falls will be the inability or indisposition of the people of the latter place to take stock to the amount of thirty thousand dollars in the enterprise, which, we understand, they have indirectly signified a willingness to do. At any rate with such men as Ezra Cornell, W. H. Sage, John McGraw, J. W. Dwight, Dean Sage, and other heavy capitalists, who were present at the meeting from New York, nothing but the most favorable results can be looked for as the occasion of the initiatory steps taken for the construction of the Chippewa Valley & Lake Superior Railroad.—*Eau Claire, (Wis.) Free Press.*

ST. LOUIS, ALTON & TERRE HAUTE RAILROAD.—A large number of the preferred stockholders of the St. Louis, Alton & Terre Haute Railroad Company, met at the company's office, No. 12 Wall street, on Tuesday, to confer together in regard to the dividend due on the stock for over two years. On motion, Mr. O. D. Ashley was called to the chair, and G. H. Watson appointed Secretary. It was stated that the company had earned in the two years over ten per cent net, and, according to the agreement with the preferred stockholders, this money should have been paid in dividends to the stockholders, but had been used in assisting the Bellville Railroad Company. After some further remarks, which were unanimous in asking the directors to declare a dividend in preferred stock equal to net cash earned, a committee of five was appointed to confer with the directors, and to report at a future meeting the expenses of the road for the last two years, and what the money had been expended for. It was hoped that the directors would declare this dividend legally due without recourse to the law by some of the prominent stockholders.

—The St. Louis & St. Joseph Railroad, running from a point on the Missouri river, opposite Lexington, to St. Joseph, Mo., 74 miles, was sold at public auction, at St. Louis, Mo., on September 13, for \$138,000. The sale was made under the order of the United States District Court. The liabilities of the road are \$1,000,000 of first mortgage six per cent gold bonds; one year's unpaid interest, about \$60,000; a floating debt of some \$200,000, and \$400,000 owing to the North Missouri Railroad Company. The capital stock authorized was \$2,000,000, of which \$1,000,000 was paid in. Daniel H. Armstrong, of St. Louis, was the purchaser.

One Pound of Coal Per Horse Power.

It is said that a firm in London is now constructing the most economical steam engines in the world. For their mill engines, these manufacturers guarantee a consumption of less than 2 pounds of good coal per horse power per hour; and they claim that in some cases these engines in practice have brought the figure as low as 1 pound of coal per horse power per hour. To realize the importance of this improvement, we must consider that ordinary steam engines, in many cases, burn as much as 10 pounds of coal per horse power per hour. This is common, when the boiler admits of the evaporation of only 6 pounds of water for every pound of coal. When engines are supplied with Cornish boilers, so celebrated for their economy (since they evaporate 12 pounds of water for every pound of coal), the ordinary consumption is 5 pounds of coal per horse power per hour; and the reduction of this amount to 3 or even 2½ pounds has thus far been considered something extraordinary—the best result, in fact, to be practically obtained. That there is, however, still room for improvement, is evident from the theory of the mechanical equivalent of heat. One pound of good anthracite coal will produce, in combustion, 14,220 units of heat; while 1 pound of bituminous coal will produce 13,500 units. Let us adopt the round number, 14,000 units; that is say, the proper combustion of 1 pound of coal should heat 14,000 pounds of water 1 degree, or 140 pounds 100 degrees, or 14 pounds 1,000 degrees Fahrenheit. But heating water 1,000 degrees changes it into steam, and experiments have proved that it takes exactly as much heat to change 14 pounds of water into steam as to heat 140 pounds of water 100 degrees. Therefore the 14,000 units of heat developed by the combustion of 1 pound of coal will change 14 pounds of water into steam; and it is by the intervention of this steam that we have to obtain the mechanical equivalent of the 14,000 units of heat. The well established mechanical equivalent of each unit is 772 foot pounds. In fact, for every foot that we cause 772 pounds to descend, we may actually obtain a unit of heat; and therefore we are entitled to expect inversely the development of a force of 772 foot pounds for every unit of heat expended. The 14,000 units of heat obtained by the combustion of 1 pound of coal should give us, then, $14,000 \times 772$, or 10,808,000 foot pounds. If the coal is burned in 1 hour, we ought to obtain this force per hour; and, as 1 horse power is equal to a force of 33,000 foot pounds per minute, or $33,000 \times 60 = 1,980,000$ foot pounds per hour, we ought to have $10,808,000 \div 1,980,000$, or 5.4 horse power per pound of coal consumed per hour. The best engines, therefore, in place of obtaining, as heretofore, only one-tenth or one-twentieth of the theoretical equivalent of the heat consumed, are reported to have reached nearly one-fifth, which is certainly a wonderful advance. Of course, the full theoretical equivalent can never be expected, for reasons which we will not now discuss. Most engineers are agreed on the main features of the most economical steam engines. They are: proportionately large boilers, with large heating surfaces, and proper grates; heating of the feed water in the condenser; high pressure in connection with proper cut-off arrangements, so as to utilize the expansion; careful protection from loss of heat by radiation; and, above all things, intelligent and faithful engineers and firemen. Many moderately good boilers and engines lose all claim to reasonable economy by improper treatment in firing.

England's Ironclads.

Chief constructor Reed, late of the English navy, in his interesting work on ironclad ships, issued in 1869, showed that, up to January of that year, £10,000,000 sterling had been expended for ironclads, while £116,000,000 had been spent on other vessels since 1859, when ironclad building began there. From the development of the last two years, it would seem but little of this £10,000,000 has been practically useful to the English people. The ironclads which have been put to sea latterly have all gone wrong. First, down went the Captain, thrilling the whole country with the horror and inexplicable character of the disaster; then the Cerberus disappointed her builders in her sea-going qualities; now, the Agincourt, a monster, has gone ashore off Gibraltar in broad daylight; while the Warrior meets the same fate near Leghorn. John Bull begins to inquire what is the matter. Chief constructor Reed is gone, could not be kept because he was quarreled with and had high wages offered abroad. These ironclads are an elephant in English hands. They are unwieldy, weighted down fearfully, and the officers called them "floating hells" to live on. And they have cost an enormous waste of time, because to stern thinking they are useless. The Agincourt, for instance, was in process of construction for at least two years; her hull cost £362,771; her engines and fittings, £83,277; masts, sails, and stores, £9,590; her total price, £458,020. The Warrior cost nearly as much. It is not merely the immense expenditure of money for an unfruitful result that galls the English, but it is the fact that much time which they considered most valuable for defensive preparation has been lost. The British taxpayer will simply grumble about the squandered £10,000,000; but he can never forgive the constructors for having failed in achieving their ideals of ironclad ships.

—The Osage Valley & Southern Kansas Railroad is advertised to be sold in St. Louis, on the 16th of October, to pay the interest now due on the bonds, amounting to about \$20,000. Boonville is at present its northern terminus, and Warsaw, in Benton county, is its south-western. Before the late civil war the road was nearly graded from Boonville to a point about ten miles south of Tipton, but the war coming on, operations were suspended until 1867, when additional aid to the amount of \$175,000 was furnished by Cooper county, and \$23,000 by Willow Fork township of this county, the work was resumed and the road bed completed and ironed between Boonville and Tipton, a distance of twenty-six miles. In 1868 it was leased to the Missouri Pacific Railroad Company for a term of thirty years, they paying 35 per centum of the gross earnings of the road, since which time that company has operated it. The sale in no wise affects the Pacific Company's lease. The interest in that part of the road south of Tipton was also revived in 1868, by the people of Morgan and Benton counties, the former subscribing \$100,000 and the latter \$200,000, which sums have been expended upon the grading of the road through those counties. The road is graded to Versailles, in Morgan county, and also about twenty-five miles in Benton county, leaving yet to be graded that part of the road from Versailles to the Benton county line, a distance of fourteen miles, and about six miles in Benton county.—*St. Louis Jour. Com.*

Capital and Labor.

The way, and the only way, in which the laboring classes of all countries can be prepared for the active and direct control of the body politic, at which they are now aiming, is the steady and persistent preaching and practice, by all classes, of the doctrine that, in the choice and pursuit of a calling, there is nothing so good either for the individual or the nation as liberty. The one thing Government has a right to do about a man's business is to protect him in the exercise of it, and in some cases to see that he is properly qualified for it. To tempt him into a pursuit by bribes, or sustain him in it by subsidies or monopolies after his own incompetence or the state of the market has shown it to be impossible for him to follow it profitably, is not only economically inexpedient, but, as now begins to be plainly seen, is politically dangerous. In other words, protectionism contains the germ of communism; what may be in the hands of sober, thoughtful capitalists a means of stimulating a useful industry, becomes in the hands of ignorant and fanatical socialists a justification of an equal division of goods. The only salvation for modern society lies in making governments let people alone in all that relates to the exercise of their faculties. Interference once begun, nobody can tell where it will end. Mr. Gowen, in his argument, brings out the fact that the leading idea of the French socialists, that no person should receive larger wages for his labor than another, and that it is an outrage on justice that a lawyer or capitalist should enjoy an income of thousands of dollars a year, while a laborer only receives a few hundreds, has found a lodgment in the mining districts of Pennsylvania also, and we fear it is not confined to Pennsylvania. The function of the capitalist in our day is one of enormous importance to the community, and, considering the losses which capitalists save to the community, and the profits they enable it to make, they are really so far as money goes, greatly underpaid. The salary of any great director of industry consists solely of that portion of the profits which he spends in personal enjoyment. Whatever portion of his income is reinvested is devoted wholly to the employment of labor—or, in other words, is used for the benefit of the community at large, and especially for the benefit of the laborer; so that, when labor reform demagogues hold up the enormous revenues of "Stewart and Astor" as subjects for popular indignation, and as signs of rottenness in the State, they simply show that they do not understand what they are talking about. Whatever these gentlemen spend in food, clothes, personal luxuries, is the real amount of their incomes; the total of their receipts is only the apparent amount. The way in which our capitalists are overpaid is in the power they acquire over legislation; and the problem we have to solve is to leave them in the management of their revenues, without letting them control the government. The task they perform for us is the most important of all economical tasks—that of discovering the places and things in which the products of past labor may be invested without loss or with profit. The talent required for this duty is one of the rarest of gifts, as everybody knows who has ever had money of his own to invest, and who sees the tremendous mistakes which people, unprovided with the necessary experience and sagacity, make in trying to invest. The prosperity of a nation, it may be fairly said, in the long run, depends largely on the number of men it produces who are able to say what enterprises

will "pay," and what will not, and the services of such men a nation can hardly reward too highly in money. The nation which produces plenty of them, and can keep them honest and public-spirited, is twice blest. There could hardly be a better proof of the ignorance and folly of socialism than the hatred and distrust of them which it entertains, and the great determination it always shows to get rid of them if it gets a chance. In the socialist and labor reform Utopia the delicate task of pointing out the ways in which the national wealth may be most safely invested, and the objects on which the national labor may be profitably expended, is usually assigned to a committee of blatherskites, selected with a rigid disregard of their mode of managing their own funds when they had any, and usually with more regard for their rhetorical powers than for anything else.—*Nation*.

ELIZABETHTOWN & PADUCAH RAILROAD—Six thousand tons of extra English rails have been purchased for the Elizabethtown and Paducah (Kentucky) Railroad, and will be delivered in March next. This purchase of rails is sufficient to finish the main track and sidings to Paducah, and, it is thought, will secure the opening of the road its entire length by the last of June next.

Forty of the ninety-two miles of road bed from Greenville to Paducah are graded and ready for the iron, and upon the remaining fifty-two miles a very large amount of work has been done, with full force upon every section, and so vigorously has the work advanced, in the last ninety days as to justify the statement that on the first day of January next there will not be fifteen miles of incomplete road bed.

Track-laying has been resumed at Greenville, and is being pushed rapidly westward to the crossing of the Evansville, Henderson & Nashville road. To facilitate the opening of the road to this important crossing, a large amount of rails are being delivered there, and track-laying will be pressed eastward from that point until it meets the track from Greenville.—*Am. R. R. Jour.*

A DANGEROUS WATER PIPE—Attention has been called several times in the *Journal* to the dangerous character of the galvanized iron pipe, when employed for conducting water to be used for culinary purposes. Instances of severe poisoning from the use of this pipe are continually coming to our notice, and we are led once more to caution our readers against it. It is almost a crime for dealers and manufacturers to recommend this zinc-covered iron pipe for water conduit, as they thereby jeopardize the health, and perhaps the lives of purchasers. When this comes from the hands of the manufacturers, it has a fresh, clean appearance, and to those who do not understand the nature of the covering the idea is conveyed that it will not oxidize or rust, like ordinary iron pipes. But this is an error; it will even rust more rapidly than clean iron in most localities. The superficial covering of zinc on the interior is attacked immediately when water is allowed to flow through, and in some instances we have known it to be entirely removed in 48 hours; the insoluble carbonate of zinc is seen to float upon the water in a tea kettle and other water vessels used in families, and this has often created alarm where no suspicions previously existed. We hope the newspapers throughout the country will caution their readers against the use of this pipe for water supply.—*Boston Journal of Chemistry*.

Virtues of Borax.

It may not be generally known how very valuable borax is in various purposes of household use. We find it the very best cockroach exterminator yet discovered. One half-pound, costing but fifty cents, has completely cleared a large house formerly swarming with them, so that the appearance of one in a month is quite a novelty. The various exterminating powders puffed and advertised have been found not fully effective, tending rather to make the roaches crazy than to kill them. There is something peculiar, either in the smell or touch of borax, which is certain death to them. They will flee in terror from it, and never appear again where it has once been placed. It is also a great advantage that borax is perfectly harmless to human beings; hence no danger from poisoning.

It is also valuable for laundry purposes. The washerwomen of Holland and Belgium, so proverbially clean, and who get their linen so beautifully white, used refined borax as washing powder instead of soda, in the proportion of a large handful of borax powder to ten gallons of water. They save soap nearly one half. All the large washing establishments adopt the same mode. For laces, cambrics, etc., an extra quantity of the powder is used; and for crinolines (requiring to be made stiff) a stronger solution is necessary. Borax, being a neutral salt, does not in the slightest degree injure the texture of linen.

Its effect is to soften the hardest water, and therefore it should be kept on the toilet table. As a way of cleaning the hair, nothing is better than a solution of borax in water. It leaves the scalp in a most cleanly condition, and the hair is just sufficiently stiffened to retain its place. This stiffness, however, can be readily removed, if objectionable, by washing with water. Borax is also an excellent dentifrice; dissolved in water, it is one of the best tooth washes. In hot countries it is used, in combination with tartaric acid and bicarbonate of soda, as a cooling beverage.—*Economist*.

CALIFORNIA PACIFIC RAILROAD—The San Francisco *Bulletin* of the 2d September says: The California Pacific Railroad Company, according to the *Solano Republican*, have given a second mortgage on that road to F. D. Atherton and Milton S. Latham, in trust, to secure the payment of bonds to the amount of \$1,600,000. The bonds are to run 20 years, and bear 6 per cent. interest. The purchase of the road by the Central Pacific, it is understood, extended only to a majority of the stock, which, beyond importance as securing control of the road, could only be of nominal value, as the first mortgage bonds had covered the value. The Central Pacific took possession of the road yesterday.

—The report of the surveyor employed to run the line of the proposed Canadian Pacific Railroad has been published. The distances are as follows:

	Miles.
Montreal to Ottawa.....	115
Ottawa to Mattawan.....	195
Mattawan to Fort Garry.....	985
Fort Garry to Yellow Head Pass..	985
Thence to the limits of British Columbia	52
Route by the Upper Fraser (British Columbia) by "short cut" ..	445-2,467
Total length from Montreal to the Pacific	2,777

The Tides.

The phenomena of the tides were known to, and were described with considerable accuracy by, the ancients, even though their observations were confined to seas in which the tidal wave was the least conspicuous. Aristotle, among other early writers, mentions that the tides always followed the changes of the moon, and notes that they were less observable in small than in large seas. These facts were mere matters of observation which could hardly be supposed to have long escaped the notice of a thinking people, but it was not until the discovery by Sir Isaac Newton of the law of universal gravitation that the phenomena of the tides were fully and satisfactorily explained.

In order to understand the action of the moon on our earth as a tide-producing body, we will suppose that the earth consists of a smooth sphere, covered all over with water of a uniform depth, and that both bodies are at rest with respect to each other; then the attraction of the moon on the water nearest to her will be greater than her attraction on the solid earth, and will cause a heaping up of the water toward her. This appears natural enough, but at first sight it does seem somewhat paradoxical that the water should also be heaped up in a direction opposite to the moon. This is explained by the fact that the water on the side away from the moon is attracted less than the solid ball of the earth, and the latter is, as it were, drawn away from the water, thus causing it also to be swelled up, although not quite to the same extent as on the other side; because, its distance being greater than in the first case, the moon attraction is less.

Now our water covered globe presents the appearance of an orange, with its major axis in the direction of a line joining the earth and moon. In this position it would remain in equilibrium, with constant high water at two opposite places and low water on a circle at right angles to and equidistant from these.

Although the sun is at a very much greater distance from the earth than is the moon, yet, from its very much greater mass, it exerts a considerable influence in producing the tides of the ocean, and acts on the water in precisely the same manner as does the moon, producing another spheroid of equilibrium, with its major axis on a line joining the earth and sun. The heaping up of the waters due to the sun is two-fifths of that due to the moon; and if the sun and moon, as seen from the earth, were separated by an angle of 90°, we should have the axes of our wave spheroids separated by that quantity, and (if the three bodies were at rest with respect to each other) so they would remain to the end of time. But since these conditions do not obtain in nature, and the earth, moon and sun, instead of being at rest with regard to each other, are constantly changing their relative positions and distances (the earth at the same time revolving on her axis), these motions never give the water time to assume the spheroidal shape. Instead of this, an imperfect form of it travels round the globe in a lunar day, which, being about 50 minutes less than the solar day, causes the tides to come later each successive day, by about that quantity. It will be seen from what has been already said, that when the sun, moon and earth are in the same straight line, the solar and lunar waves are coincident—that is, the sun and moon are acting in concert—and the consequence will be that the tides about this time will rise higher and fall lower than they do

when the sun and moon are at right angles to each other. When this latter condition obtains, their action is antagonistic, and we have a tide that never rises so high nor falls so low as in the former case. That is to say, the highest, or spring, tides happen at the full and new moons, the lowest, or neap, at first and last quarters.

To calculate the time and height of a tide, supposing the earth covered uniformly with water, would, comparatively speaking, be a matter of small difficulty. But from the fact that our earth is not so covered, but made up of water and land unequally distributed, consisting of large oceans broken up by continents and dotted with islands, it is in reality one of the most difficult questions in physical astronomy.

The great height to which the water rises in some of our estuaries and tidal rivers is not due directly to the action of the sun and moon, but to the tidal wave of the ocean, which, rising at the mouths of rivers, causes the water to rush up the channel with very great violence where, as in the Severn, England, it is suddenly narrowed.

MINERAL RESOURCES OF COLORADO.—There is probably no more profitable field for the investment of capital and labor than in mining with the advantages now offered—cheap labor, cheap transportation and cheap supplies—while there is added to this the fact that there is now in operation in the country, mills and other sorts of reducing machinery, which obtain from the same grade of ores twice, and in some cases, ten times the amount of gold and silver formerly obtained. Many miners who, years ago, became discouraged after having labored in different localities on many mines, and abandoned the country on account of the Indians and high prices, have returned and resumed work on their abandoned claims and are now realizing large profits.

Only one thing more is needed to insure Colorado, within a very few years, of being, perhaps, the largest gold and silver producing State in the Union, viz: railroads from the coal fields of the plains to the mining regions of the mountains, and these we are promised by the railroad men as soon as the work can be done. When these are built, then will begin the "times of prosperity" in Colorado.—*Col. Monthly*.

CUMBERLAND VALLEY RAILROAD.—The Hagerstown Mail says the work of laying the rails upon the extension of the Franklin (a continuation of the Cumberland Valley) Railroad from Hagerstown, to Powell's Bend, on the Potomac river, is being vigorously executed under the direction of the chief engineer of the company, Major Edward Watts. The graduation of the road, under the supervision of Major Watts, was executed by Mr. James March, a thorough railroad man, and is said to be a model piece of workmanship. Mr. March is now engaged on the filling and excavation of that portion of the same line which extends into Virginia, known as the Martinsburg & Potomac Railroad, and the chief engineer is, we understand, arranging his plans for the construction of the bridge across the Potomac river. We anticipate that a very few months will be permitted to pass before this road, or a portion of it, at least, will be open to the public. When completed it will be one of the most substantially constructed railways in the United States.

Labor.

It is a well settled axiom that labor, being the basis of production, is the foundation of wealth, both individual and national. The success of a nation and the happiness of a people most depend upon the quantity and the intelligent direction of its labor. In no other part of the world is there as wide a field for labor as in this country; but there are several problems to be solved in regard to its direction, before the best results can be reached, the principal of which relates to the distribution of the profits of production. A London journal speaks of the United States as being the very El Dorado of working men—the boundless field where skilled industry is well rewarded, and where unskilled workmen, day laborers, who toil with their hands at the humblest employment, get more wages per day than is paid to workmen in some parts of Europe per week. For years to come, the plantations at the South, and the undeveloped lands at the West, will call for all the laborers emigrating to this country, and the prospect of the industrial classes is in the highest degree encouraging. The European laborer, when transferred to this side of the Atlantic, is not only in receipt of many fold better wages, but his wants increase correspondingly. He seeks to be something more than a mere machine to grind out a certain amount of daily labor, and constantly aims to raise his social position to that of his more fortunate neighbors. This is one reason that the condition of the workingman in this country though so much better than that of his fellow in Europe, is sometimes a matter of complaint. Another drawback is the vicious system of trades unions, which after having been productive of bad results, is fast falling into decay in England, and bids fair to follow the same course in this country. Its failure results from an attempt to fix an arbitrary standard by which to measure the work of all men. Such a system is antagonistic to free man who has not the liberty to make his own bargains, and who has not the liberty to make the best possible use of the powers with which he is endowed.—*N. Y. Ship. List*.

CEMENT FOR METALS.—The new cement for metals and machinery, consisting of mixtures of litharge and glycerine, which form the most powerful adhesives known, are said to be coming into general use. In the preparation of these cements the litharge is mixed with the glycerine of commerce, in proportions varying according to the way in which it is to be used, whether as a cement or a dressing. When prepared as a cement, the mixture is spoken of by several of our scientific exchanges as peculiarly applicable to the joining of metals, and to apparatus and machinery of all kinds—resisting water and remaining firm under a less heat than 500° Fab. When employed for luting, the lead and glycerine are carefully blended, the latter being added gradually until the requisite consistency is secured. The joints or surfaces to which the application is to be made are carefully dressed with a little glycerine alone, and the cement is applied as soon as mixed. These compositions are said to resist not only water, steam, and concentrated or other acids, but also alkalis, ethers, alcohol, sulphate of carbon, benzoline, and other hydrocarbons, and the great variety of uses to which they can be employed give them an importance only equaled by their utility.

DESTRUCTIVE EFFECT OF SALT ON AXLES.—The London papers give accounts of several accidents on railways occasioned by the fracture of the axles of salt cars. It appears that between the sound portion remaining and the outside of the fractured axle the surfaces were quite smooth, presenting the appearance of having been severed by a sharp instrument. This peculiar effect is thought to have been caused by the gradual action of the brine on the metal, the heat at the hoos favoring the evolution of chlorine from the brine, and it then combining with the iron to form a soluble chloride of iron. From the position of the defect it was not discoverable by any ordinary inspection; and, whatever may be the scientific explanation of the peculiar destructive action which thus goes on in the axles of salt cars, the fact must be regarded as a very serious one—especially in view of the statement made that, on one railway alone, no less than seven axles of salt cars were broken while running in a period of less than three months, and this out of a total number of about five hundred wagons, showing an enormously large proportion as compared with the fracture of cars of any other description of rolling stock. To diminish this liability, the plan has been proposed that, in addition to requiring such cars to be provided with well-constructed axles of good quality, it shall also be insisted that the date of their commencing to run be stamped upon the axles, and that a reasonable number of years be prescribed as the maximum of their being used.—*Amer. Artisan.*

INDUSTRIAL PROGRESS OF WISCONSIN.—Greeley, writing from Green Bay, Wisconsin, speaks as follows concerning the industrial advancement of the State:

"Thousands of new homesteads have during the past six years been hewn from the great northern wilderness, as thousands more will shortly be. New and renovated dwellings are visible on all sides. Great discoveries of iron ore have recently been made, mainly in the great wilderness stretching eastward from the Menominee, and several blast furnaces have been erected, mainly on or near this bay, though by far the largest is located at Milwaukee. As yet, those in the northern counties use Lake Superior ore, costing \$7 per ton, and melt it with charcoal costing nine cents a bushel, making each ton of metal cost \$28; and since its price in Chicago is but \$33, the profit is small; but cheaper ores will doubtless be found and used, insuring a cheaper product and perhaps larger profits.

"The Chicago & North-western company is pushing its railroad hence to Escanaba, where it meets that from Marquette, giving an unbroken line from Chicago to Lake Superior on the north and to Omaha on the west. Branches of this road permeate the State at different points and are in process of further extension. A railroad from Milwaukee up the Lake Shore to Sheboygan and beyond is soon to be constructed. The Pineries yield enormous and annually increasing quantities of lumber. In short, Wisconsin is rapidly going ahead."

— The entire line of the Iowa & Minnesota Railroad, from Ft. Dodge to Garner, on the McGregor road, has been put under contract, and has already been sub-let. Upon that part between Ft. Dodge and Clarion, work has been commenced, and is now being prosecuted; and work will be immediately commenced on the part between Clarion and Garner.

Railroad Items.

— A meeting of the directors of the South-west Pennsylvania Railroad, which is to connect Greensburgh with Charleston, W. Va., was held on the 22d ult. Thos. A. Scott occupied the chair. The meeting was called to open the bids and make contracts for the building of the road from Greensburg to Connellsville, but no awards were made, the matter having been adjourned.

The new road will pass through Connellsville, Uniontown and Morganstown, and will open up a new route between the East and the West.

— The location of the Decatur & State Line Railroad has been somewhat changed so as to meet the Rock Island road at Bremen, instead of Mokena—six miles nearer Chicago. The road will be ready for operation from Bremen to the Kankakee river, Jan. 1, next. The contract for grading and bridging for about 40 miles, from the river south to Chatsworth, was let last week, to be completed this year.

— The Chicago, Burlington & Quincy Railroad Company is extending the Mendota & Prophetstown branch to Clinton, to connect with the Chicago, Clinton & Dubuque Railroad, making, by it and the Chicago, Dubuque & Minnesota Railroad, a new route from Chicago to Minnesota.

— The Burlington & Missouri River company are accepting bids for the grading of a railroad from Crete to Beatrice, and expect to commence work in a few days. The road is to be finished and cars running by Jan. 1st.

— The surveyors of the Burlington, Cedar Rapids & Minnesota Railroad reached Plymouth (on the Milwaukee & St. Paul road), 9 miles north-east of Mason City on the 7th. The company intend to send on workmen, immediately, so as to have the grading done before cold weather.

— An engineering party has commenced the final location of the Baltimore, Pittsburgh & Chicago road from Pittsburg westward, and expect to reach the Ohio line by Nov. 1.

— The Burlington, Cedar Rapids & Minnesota Railroad proposes to construct a branch from Cedar Rapids, nearly due north through Independence, to some point on the Milwaukee & St. Paul road. The town of Independence has voted to subscribe \$30,000 in aid of it.

— The Toledo, Peoria & Burlington Railroad Company, have commenced laying iron on the Burlington division; and the grading was to have been finished by the 25th, and that the cars are expected to that city about the 5th of October.

— The grading of the Chicago, Clinton & Dubuque Railroad is done from Dubuque south to within 10 miles of Sabula, and will, it is expected, be finished to Clinton by November. Bridges are in course of construction over the Catfish and Maquoketa rivers, and the track will probably all be laid this year.

— The track of the South-eastern Railway was to be completed to Evansville, Ind., and trains will be running over the whole line by Oct. 1. When completed, this will be the shortest road from St. Louis to Louisville.

TESTING PETROLEUM.—Prof. Vander Weyde's new test for the adulteration of kerosene seems to be of immediate practical value. This test for petroleum is founded on the fact that all vapors given off by petroleum are combustible, and that if any kerosene or other preparation from petroleum gives off a vapor at the accepted standard temperature of 110°, it is not necessary to try whether it will burn, but sufficient to collect it in a proper vessel, by which we gain the additional advantage that we may measure the quantity of the vapor, while none of it can be lost by air currents incidentally passing over the surface of the liquid. He takes, therefore, a glass tube closed at one end and open at the other, and fills it with the petroleum to be tested, then closing the open end with the finger, inverts it in a vessel with water warmed to 110° by mixing hot and cold water, and keeping it at that temperature by occasionally adding hot water. If now any vapor be apparent, it will collect in the closed upper part of the tube, displacing the oil downward. The amount of this gas will be a comparative test of the different qualities of oil and for this purpose the tube may be graduated in order to measure the amount of volatile liquid present in the same. This method is not subject to the discrepancies found in the usual way of testing, in which an impure and dangerous quality of oil may be made to appear better than it is by slow and gradual heating, and which if performed in a slight draft of air will have the vapors carried off as soon as developed, so that it becomes impossible to ignite them. This new method gives freedom from the danger of fire, more accuracy, a trustworthy means of measurement, and no chance for deception.

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The Railroad Record.

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Railroad Experience and its Teachings.

In our last article we summed up some of the teachings of railroad experience. They are in some respects so extraordinary and so important, that we will continue the subject briefly:

1. *Tonnage, and the Export of Products.*—We stated generally that, deducting duplications, there were 100,000,000 tons of freight carried on railroads, and that in 12 years, viz., from 1858 to 1870, the increase had been 450 per cent.; that is an average of 37 per cent. per annum! This is enormous. To understand it (and the understanding of it is necessary to the true comprehension of the value and future growth of railroads), we must consider that production, especially agricultural production, increases in this country at about double the rate of population. The result of this is, that the moment any district of the country becomes self supporting, and begins to have a surplus, that surplus increases at a much greater rate than the population; and, as it is this surplus which makes the tonnage of railroads, so we see the tonnage of railroads actually increases much faster than any other element. This point is particularly shown in the freight earnings. In 1867, the earnings from freight were fourteen times greater than in 1851; but the number of miles of railroad only six times greater, and the rate per mile only three-fourths of what it was in 1851.

Take the following table of freights carried on the roads of New York, from 1858 to 1867:

In the three years	
1859, 1860, 1861, }	.....14,061,465 tons.
In the three years	
1862, 1863, 1864, }	.....21,847,501 tons.
In the three years	
1865, 1866, 1867, }	.....26,943,019 tons.

We see here an increase, in the old State of New York, of nearly 100 per cent. in nine years. Now take the following roads in Ohio and Michigan:

	In 1858. Tons.	In 1870. Tons.
Cleveland & Col.....	255,668	831,644
Cin., Ham. & Dayton.....	268,829	419,350
Marietta & Cincinnati.....	77,244	394,343
Ohio & Mississippi.....	56,394	528,704
Central Ohio.....	153,484	211,305

Results of 5 roads.....811,629 2,385,346

In 12 years we have an increase of nearly 200 per cent., or 16 per cent. each year. Now the increase of population does not exceed 3 per cent. per annum. Now we can see how this has come about, if we consider, as we have stated, that it is the result, not of the ratio of growth, but of the ratio of surpluses. Now we will give a mathematical illustration of how that operates. The production increases at 60 per cent., while the population increases at 30 per cent., in round numbers. Now we will begin at the point where the production is just equal to the wants of the population, and with the above ratios we have these results:

	People.	Products.	Surplus.
1st year.....	100	100	0
2d ".....	103	106	3
3d ".....	106	112	6
4th ".....	109	118	9
5th ".....	112	124	12
6th ".....	115	130	15

In one word, the entire growth of population (that is, the ratio) becomes a surplus (ratio of surplus) after the year in which production and consumption become equal. Now let us apply this to a longer period of time. We have these results:

	People.	Products.	Surplus.
10 years.....	130	160	30
20 ".....	170	256	86
30 ".....	220	400	180

In 30 years, while the population has not doubled, the surplus of products has increased six fold. This is the actual history of the United States in regard to population and products. This explains fully why it is that the tonnage of railroads is increasing at such a rapid rate, and moreover it is perfectly certain to continue; and unless railroad freights are very much reduced, the profits of railroads from this source will be enormous.

2. *Tonnage increased by the Cheapness of Transportation.*—Suppose that corn is \$1 per bushel in New York, and that wagoning cost 50 cents per 100 miles, as it probably would

do, it is plain that corn, in gross, could not be marketed at more than 150 miles from the place of production. Now, suppose a through line railroad to New York is made, which carries a hushel of corn 800 miles for 50 cents. We see then that the radius on which corn can be marketed with profit has been increased from 150 to 800 miles. What is the result in relation to the production and marketing of corn, wheat, cattle, hogs, etc.? 150 miles gives 17,500 square miles; 800 miles radius gives 640,000 square miles. Then the area from which surplus products can be carried to an outside market by rail is forty fold greater than that from which it can be carried by wagon. The difference is immense. But this rationale is not only true of the change produced from wagon to rail, but it is also true to some extent of the increase of railroads from year to year. Here, then, we have one great cause of the great increase of tonnage on railroads, and it seems evident to us that this great ratio of increase will go on for some years to come.

3. *Of Passengers.*—It will be observed, that the number of passengers increases largely, and larger than the rate of increase in population, but not equal to the ratio of increase of tonnage. But, in all probability, the rate of increase in passengers will increase faster hereafter. This will arise partly from the increase of small towns, and more from this very increase of tonnage, because the increase in tonnage, especially of manufactures, carries with it the necessity of a larger number of persons to care for them, and to attend to their particular interests.

From this review of railroad experience, which we have endeavored to make accurate, it seems to be evident that railroad business must increase rapidly for many years, and that railroad profits must increase also.

A NEW MUSICAL MAGAZINE.—*Church's Musical Visitor* for October, a new monthly devoted to music and the fine arts, published by John Church & Co., 66 West Fourth St., Cincinnati, O., has reached our table. A casual examination of this first number is sufficient to convince the reader that it is no "catch-penny" affair either directly or indirectly, but that the publishers evidently design to publish a first-class musical and art magazine in every respect. The initial number before us is literally crowded with musical, dramatic, and art matters of moment. The news is full and fresh, the editorials creditable, and the selections admirable. Three new pieces of music, the first installment of what promises to be a capital story, written expressly for the *Visitor*, appears, together with a fine little poem by Mrs. Hetty Morrison. The arrangement is in fine taste, the typography first-class, the title page beautiful, and the whole one of the finest and cheapest musical publications in this country.

The Kentucky & Great Eastern Railroad.

We have heretofore alluded to this new enterprise, as one of vast importance to not only the section of country through which it is to pass, but also to the commercial interest of the entire south-west; especially to the city of Cincinnati. There is no enterprise either completed or contemplated, that will work out greater results to the commercial interests of our city, than the Kentucky & Great Eastern.

First, it will unquestionably supply one great desideratum to the manufacturing interests of this city—(when we speak of Cincinnati we include Newport and Covington)—the one most severely felt at this present moment,—COAL. It will bring the bituminous and splint coals of Eastern Kentucky within from eighty to one hundred miles of rail transportation of our doors. This short transit by rail will enable the company at all times to compete with the river, in this great article of traffic, and essential element of industrial success. From ten to ten and one-half cents per bushel, delivered in the yard, will afford an ample margin for both miner and carrier; and a very little calculation will demonstrate the practicability of delivering this coal at our doors at this price.

If we count the greater distance on the direct line of the road in Lewis county, the necessary transit will be but one hundred miles. But the very best of coal—for all purposes—splint, or semi-cannel coal—can be reached in a less distance by a branch road from Maysville into Fleming county; this would place the mines within about eighty miles of this city. But suppose we estimate on the longer distance what will be the cost of coal delivered in the yard by switch tracks. Coal is profitably carried at a charge of 1½ cents per ton per mile. Counting 28 bushels to the ton, and 100 miles the distance carried, the cost of coal would be in the yard, as follows:

Transportation 100 miles, @ 1½c. per ton per mile.....	5½
Mining	4
Royalty to proprietors.....	½
Total cost.....	10

What is true of coal, is likewise true in reference to iron ore. The traffic in these two items alone, in amounts sufficient to meet the necessities of factories already established in and around Cincinnati, would furnish a very respectable traffic for the road, and would go far towards paying a fair dividend on its cost of construction.

The two furnaces in the city of Newport alone, could profitably consume the ore and coal of a train of thirty cars a day, the year round. This is exclusive of other factories, and for ordinary domestic consumption, which it would be but fair to estimate for that city,

for the single item of coal, at an equal amount of tonnage.

We will not undertake to enter into an estimate of the wants and necessities of the city of Cincinnati with her thousand factories. It is enough to know that the want exists, and that with the increase of facilities to obtain the raw material for manufactories, that manufactories will increase. The source of supply is inexhaustible, the means of transit will be direct, perfect and cheap, and the demand will increase in a corresponding ratio.

This is not all. We might write a volume in reference to the trade of Eastern Kentucky and West Virginia, and their well known mineral resources, while the local passenger traffic of the line will be unsurpassed by that of any road in the State of Ohio.

The people of Mason county, Kentucky, have just voted on a proposition to aid in the construction of the road. It was for a county issue of bonds to the amount of \$400,000. With the substantial basis of county local aid and individual subscriptions already assured there can be no doubt of the success of the enterprise. The vote of Mason county is, by the friends of the road, considered a guaranty of success in the subscriptions of the other counties along the line.

Of the contest and result in Mason county, the *Eagle* says:

"The battle for the subscription to the Kentucky & Great Eastern Railroad has been fought and won. It was gallantly fought and right gloriously won. The proposition received 1,996 votes, while 1,176 were cast against it. Our majority is 820. But we have not only a majority of the votes cast, but also a majority of all the legal votes in the county. The white men who voted for the proposition constitute a majority of all the white votes in the county, and a majority of fully six hundred of all the white votes that were polled. We have carried a majority of the precincts of the county. We have carried the county without counting the vote of Maysville, which does not number more than 750, some of whom voted against the proposition and others of whom did not vote at all. Those who voted for the proposition own the greater part of the wealth of the county and pay the greater part of the taxes. The largest taxpayers in the county voted for it; the largest taxpayers in the city voted for it; and the largest taxpayers in the county outside of the city voted for it. Some persons unfavorable to the enterprise were pleased to designate the workmen of Maysville who earn their honest livings by their own toil as paupers. But the opponents of the road took the real paupers out of the county poor house at Sardis, and voted them against the proposition, while we did nothing of the kind. The first speech made to the negroes, the first attempt to influence them was made by an opponent of the road. The only attempt at intimidation made at all was made by them. They threatened to turn negroes from their service and to drive their wives and children into the cold, and thus influenced many of their votes. The same 'healthy influence of the landlord over the tenant' was practiced successfully over some white laborers, and failed in other cases of its object. Even merchants were de-

terred from voting by the same threats of proscription. We are glad to say that we have no knowledge of any such disgraceful expedients being resorted to by the friends of the road to influence a single vote. They threatened no one. They bullied no one. They indulged in no abuse of any one because of his opposition. They misrepresented no one. Their fight was made in the open field and they won it fairly and squarely. They have nothing with which to reproach themselves. They ask for no special favors towards themselves, they treat with contempt all menaces of proscription; but they bear no malice or ill will towards any open and candid opponent of the proposition. In voting they discharged their own duties according to the lights they had, and they concede the same right to others without making it a cause of quarrel. We are all in too good humor over our splendid victory to abuse any one or even to angrily resent abuse of ourselves.

COAL AND IRON IN WESTERN VIRGINIA.—The *Greenbrier Independent*, published on the line of the Chesapeake & Ohio Railroad, says that "by actual measurement a four-foot vein of coal will yield 125,000 bushels to the acre. The aggregate coal strata in Fayette county amount to at least 40 feet solid coal, or 1,000,000 bushels upon a single acre!

Prof. Daddow says that this coal is superior for furnace or ore-melting purposes to that of the Kanawha Valley. Of iron ore throughout that country there is no lack. But if there is, the Alleghenies are filled with it, and if it pays to carry the raw ore from Iron Mountain, in Missouri, to the coal at Pittsburgh, a distance of 700 or 800 miles, why should it not pay to carry the raw ore from Jackson river to Bowyer's ferry, only 100 miles? The day is not far distant when the smoke of one furnace, connecting with that of another, will hang in one dense and unbroken cloud from Clinton forge to Huntington, and at night the waters of the Greenbrier, the New river, the Kanawha and the Ohio will be lighted up with one continuous glare, from Greenbrier bridge to Big Sandy. The timber along the entire line, and within reach of it, is worth one hundred times more to-day than what the land and all its timbers and minerals is selling for. We know of coal regions where lands sell readily at \$1,000 and \$1,500 per acre—lands that a few years ago you could have bought for 25 cents an acre."

NORTHERN PACIFIC RAILROAD.—At a meeting of the directors of this company, held in this city on the 29th ult., the contract was let to Payson, Canda & Co., of Chicago, for the construction of the road from the Red river to the Missouri river, two hundred miles, to be completed by the first of July next. At the same time the contract was let to DeGraff & Co., of St. Paul, for the construction of the St. Paul & Pacific, from Sauk Rapids to Brainard, to be completed by December first. Also, the line from St. Cloud to Pembina, to be done before the first day of January, 1873, a distance of about three hundred and fifty miles. The completion of these contracts will put the territories of Dacotah and Montana, as well as the Districts of Manitoba and the great valley of the Saskatchewan in direct communication with the entire system of railways of the United States and Canada, and make a grand total of about eight hundred and fifty miles of railway under the management of the Northern Pacific in Minnesota and Dacotah.—*Am. R. R. Jour.*

Chicago—Her Disaster.

It is impossible to contemplate the calamity of our sister city without feeling the deepest sympathy for her sufferings of which our human nature is capable.

No parallel misfortune is mentioned in history. The great fire in London, nearly 300 years ago, has until now been considered the most devastating the world ever knew, but its effects were not as far-reaching as the conflagration which on last Monday reduced a prosperous, enterprising community of 250,000 souls to bitter and almost hopeless poverty.

It is nearly impossible to conceive the extent of this calamity. The combination of untoward events is too great for the mind to fully realize. We beheld the Sabbath sun going down on a great city, the embodiment of American energy, the center of trade of the great North west, its very foundations a successful effort against natural obstacles, a place where to will was to do, proud of its past achievements, sanguine of its future—and, to-day, where is it? The next descending sun went down upon a scene of desolation, of ruin, and of despair.

One hundred and sixty business blocks in ashes, \$300,000,000 of property destroyed, and thousands of people shelterless, starving, naked, without water, and in darkness! This is the history of Chicago for twenty-four hours. Can the human mind take in this sudden change? Can we bring home to ourselves the appalling misfortune that would suddenly deprive civilized life of all its elements of comfort and luxury, and reduce it to the condition of abject helplessness and savagery?

The thrill of horror that went through the country was succeeded by a deep sympathy. Never was there such an outpouring of relief. It was no longer "the rival city," but "our suffering sister city," and to her help in this hour of misfortune was bent the business energy of the nation. How many millions of dollars have already been contributed, it is impossible to estimate—how many car loads of clothing, provisions, supplies of all kinds, have been received, and are still coming, are countless—but human nature, in its brightest phase, shines forth to-day, in this noble emulation in responding to the piteous cry for help from desolated Chicago.

The loss has not been confined to the inhabitants of that city. Men far away heard with blanched cheeks the telegraphic story. Their all was ventured there. And the underwriter, with memories of fierce fires in the past, trembled for his company. The heavy stocks of goods lately sent from the East were not all paid for—would the insurance cover the loss? And what of the railroads, with a terminus destroyed, and depots and adjuncts burned? It was a widespread calamity, taking in its scope the entire country. The commercial system had been injured in a vital part, and the entire organism felt the shock.

Men could but hope that it was only property that perished this time, and that it was not a repetition of the wholesale human slaughter that has made the chief ingredient in our recent cups of horrors.

Was this disaster avoidable? Under the circumstances, certainly not. Given, a city largely of wood, built upon a prairie, at the mercy of gales, with "miles of lumber yards" to scatter their burning fragments over the town, what could the best fire department do to curb an element so treacherous. What signified "fire-proof buildings of iron and stone, when surrounded by frame houses made tinder boxes by protracted hot weather. And how the fallacy of fire-proofs is made manifest by the statement that "the fierce flames expanded the iron frames and girders, forcing the walls apart, and the stone crumbled into sand."

Chicago grew rapidly but unsubstantially. She has to learn the lesson of San Francisco by experience. It is a dear one, but she will profit by it; and when she rises again from her ashes, as she must inevitably do, we shall see a more enduring if not a grander city.

Chicago numbers among her periodicals, two well conducted railroad papers, the *Gazette* and the *Review*. To these cotemporaries, who shared the general fate, we extend our sympathies, and hope soon to see them on our table again, in pristine freshness, for they represent a railroad city, and mark its forward progress by their own prosperity.

EAST RIVER BRIDGE.—For the last five weeks operations have been steadily going on at the New York terminus of the East river bridge, preparatory to placing the caisson and planting the masonry. The locality adjoins the Roosevelt street ferry, and presents a busy scene. About 100 men, including dock builders and ship carpenters, are constantly at work there under the supervision of the engineer in charge, and several divers and borers are constantly employed. At the northern end of the site a new pier has been built, and inclosed with the most solid plank, forming a perfect breakwater. This diverts the tremendous current, and gives a space of still water for submarine operations. The entire pier, which is 400 by 100 feet in extent, has been covered over in the most substantial manner, to afford conveniences for the heavy machinery, lumber, &c., to be used upon the structure. Where the caisson is to be sunk the bed of the river has been dredged to the depth of 37 feet. About 20 feet of mud and all sorts of refuse has been taken out, and several valuable and antique relics have been found, including arms, coins, pieces of ship furniture and a part of a human skull. A boring apparatus has penetrated to a depth of 66 feet below high water mark, and at this point a layer of quicksand 6 feet in depth has been reached. It has been found that the rock strata 83 feet down is of a nearly uniform grade, and to this level the caisson is to be sunk. This will be a more difficult undertaking than placing the Brooklyn caisson, owing to the facts that this one is 4 feet larger than that was, and that the current will interpose a much greater opposition.

St. Paul & Pacific Railroad.**FIRST DIVISION.**

Poor's Railroad Manual has the following statements in regard to this road:

[The St. Paul & Pacific Railroad (1st Division), including the St. Paul & Pacific Railroad with their land grants, have been recently purchased by the Northern Pacific Railroad Company, and will, when completed, be operated by the latter as a part of their line. The former, however, maintain their organization and keep a separate account of operations.]

LINES OF ROAD.

St. Paul, Minnesota, to Sauk Rapids
Minnesota..... 76 miles.
St. Anthony (10 miles north St.
Paul), to Benson, Minnesota.....135 miles.

Total length of all lines in operation Jan. 1, 1871.....201 miles.
Sidings and other tracks, 8.6 miles; gauge, 4 feet 8½ inches; rails, 56 lbs. to yard.

The road is being extended from Benson to Breckenridge, on the Red river of the North, 80 miles further west, of which 31 are graded; and iron and ties have been purchased for the whole length. This division will be completed before the close of 1871, and a connection made with the Northern Pacific Railroad.

The company are also extending their line from Sauk rapids 60 miles to the north to a junction with the Northern Pacific at its crossing of the Mississippi. This line is also to be branched at St. Cloud, and run 136 miles up the valley of the Sauk river, crossing the Northern Pacific at Otter Tail lakes, and extending down the east bank of the Red river to the British boundary.

From St. Paul to Sauk rapids, and from St. Anthony to Breckenridge, the company have a land grant of ten sections for each mile of road completed, namely, six sections per mile under act of Congress, approved March 7, 1857, and four sections additional under act of March 3, 1865. The total length of line entitled to these grants is about 400 miles, and the estimated amount of land accrued and accruing will be about 2,560,000 acres.

In 1870 the interest account to be provided for amounted to \$941,276 65, while the net revenue from operations was \$168,775 24.

FINANCIAL STATEMENT.

Cost of the line from St. Paul to Sauk rapids, 76 miles—railroad, \$3,660,289 02; and of equipment, \$169,576 12—total, \$3,829,865 14; cost of line from St. Anthony to Breckenridge, 205 miles—railroad, \$9,146,514 59; and of equipment, \$370,414 59—total, \$9,516,929 18; and cost of shops and shop-stock, \$100,236 19. Total cost of property, \$13,446,030 31.

The line from St. Paul to St. Anthony, 10 miles, is encumbered by a trust deed, dated March 11, 1862, for..... \$120,000
The entire road from St. Paul to Watah, 80 miles, is also mortgaged to secure bonds amounting to 700,000
And the lands (granted in 1857) are mortgaged for..... 1,200,000

Total mortgage on road & lands \$2,020,000

The land grant mortgage is also a second mortgage on the road.

For the purpose of completing and equip-


ping the road from St. Paul to Watab and retiring all outstanding bonds, the company have executed a general mortgage covering all of the property, land of the original and additional grants, franchises, etc., between St. Paul and Watab, amounting to \$2,800,000. Of this amount, \$2,020,000 is retained in the hands of trustees, to be used in retiring all prior issues, and the remainder \$780,000, is made payable, principal and interest in gold, at London, and also receivable at par by the company for lands.

The main line is completed to Benton, 125 miles from St. Anthony, and the grading is completed 30 miles further, the iron purchased and on its way, and by October 1, 1871, it is expected the road will be completed to Breckenridge. The Western Line is encumbered by two mortgages—one securing bonds to the amount of \$3,000,000, which is a second mortgage on the first 150 miles of road, and also a first mortgage on the lands granted under the act of 1857 for the same distance; the second securing bonds to the amount of \$6,000,000, which is a first lien upon the roadbed and upon all the lands granted by the act of March 3, 1865, and upon all the lands granted for the construction of the last 60 miles of road.

LAND DEPARTMENT.

The extent of the land grant on the two lines to Watab, 80 miles, and to Breckenridge, 205 miles, at 10 sections per mile of road, will amount to 1,824,000 acres. Received to January 1, 1871, deeds for 610,281.39 acres. Sold and conveyed, 41,099.10 acres, and sold under contract, 57,939.30 acres. Total sales, 99,038.40 acres, at a general average of \$6 25 per acre. Land sales heretofore are all within a few miles of the road, and are consequently the most valuable. Total receipts to date, \$337,674.32, of which \$87,000 were in bonds, and \$250,674.32 in cash. Expenditures in seven years, \$131,739.97. Balance to interest account, \$117,934.35. These lands are not taxable until conveyed. For this privilege the company pay the State of Minnesota 1 per cent on their gross earnings for the first three years after 30 miles of road have been completed; 2 per cent for the next seven years next ensuing, and 3 per cent thereafter in lieu of all taxation and assessment whatever. If the company's land, as is anticipated, reach an average of \$8 per acre, there will be collected from this source a sufficient amount to pay off their whole funded debt. The towns laid out by the company on the roads severally are expected to enhance the value of their lands to the extent at least of \$1,000,000.

ANTS AS ENGINEERS.—It appears that the ants in Panama are not merely mining engineers. They build tubular bridges. A corresponding member of the Glasgow Natural History Society, who has lately been in that country, describes the curious covered ways constructed by these ingenious insects. In tracing one of these covered ways, he found it led over a pretty wide fracture in the rocks and was carried across in the air in the form of a tubular bridge of half an inch in diameter. It was the scene of busy traffic. There was nearly a foot of unsupported tube from one edge of the cliff to the other.

 In a new puddling apparatus the furnaces have an oscillating movement imparted to them, for throwing the molten metal from side to side, and thereby mechanically puddle the iron.

Kansas City, St. Joseph & Council Bluffs Railroad.

REPORT FOR THE YEAR ENDING JUNE, 1871.

This line of 205 miles in length, with branch of 60 miles, constitutes one of the most important, and taking into account the difficulties attending its launch, one of the most useful and successful of our Western roads. The fluctuations and complications in the commercial world, occasioned by our civil war, made any consolidations upon a practicable and permanent basis, a work of great difficulty, and of doubt as to results. Happily, however, this company has achieved more than even its most sanguine friends anticipated, as will be shown in the brief synopsis we make of the last directors' report, from the hands of James F. Joy, president of the road:

HISTORY OF THE ROAD—CONSOLIDATIONS.—This railroad was originally the property of several distinct corporations, viz:

The Missouri Valley Railroad Company, from St. Joseph to Atchison, which railroad was mainly built by aid from the State of Missouri, and was by degrees extended to Kansas City, when it was consolidated with this company.

The Council Bluffs & St. Joseph Railroad Company, which built the railroad from Council Bluffs to the southern line of Iowa, and the

St. Joseph & Council Bluffs Railroad Company, which built the link from St. Joseph to connect with the last named railroad on the north, and with the Valley Railroad on the south. In 1868 the two companies owning the line between St. Joseph and Council Bluffs were consolidated under the name of the St. Joseph & Council Bluffs Railroad Company, and in 1870 this company was again consolidated with the

Missouri Valley Railroad Company, and then took the name it now bears.

ROUTE AND RESOURCES.—The main line extends from Kansas City, Mo., to Council Bluffs, Iowa, 205 miles, with a branch from St. Joseph north easterly to the Missouri State line, 60 miles, making 265 miles of road.

The main line is all the way upon the bottom land of the Missouri, with scarcely any grade at any point, the maximum being about 15 feet. These bottom lands are mainly on the east side, averaging from seven to nine miles in width. The road runs nearly through the middle of them. The breadth in cultivation, as nearly as can be estimated, is increased by a third in the present year over the past, and it can not be long before it will be all under improvement.

The business of the main line of the Burlington & Missouri Railroad runs over this road from Council Bluffs, about 16 miles, and the branch strikes this road at Hamburg, about 50 miles from Council Bluffs, and runs up to Nebraska City, about 9 miles. The business of both Hamburg and Nebraska City, the most important points between St. Joseph and Council Bluffs, has, therefore, to a large extent, been lost to this company, while rates have been considerably affected by competition.

In addition to rapid changes in the routes of travel, and consequent great division of business, that of the company has been seriously affected by causes which time will obviate.

Notwithstanding these and the rapid progress of improvements by other railways, materially affecting the revenues which it was

reasonable to expect that this railroad would command, its earnings have been enough to pay the interest on all its securities, and it is believed will in the future continue to increase.

The earnings were from August, 1868, to March 31, 1870:

From passengers	\$581,073 35
“ freight	449,682 21
“ miscellaneous	51,154 52
Total	\$1,081,910 08
Operat'g expenses \$611,342 59	
Taxes	21,661 21
Boston office	9,061 27
Interest & exchange 400,964 61	
	1,043,029 68

Balance to income account 38,880 40

The earnings for the last fiscal year, being from April 1, 1870, to April 1, 1871, were:

From passengers	\$637,178 85
“ freight	505,138 54
“ miscellaneous	76,185 76
“ interest and exchange	3,434 62

Total

Operat'g expenses \$729,802 28	
Taxes	31,531 06
Boston office	8,887 21
Rents	3,640 57

773,861 12

\$448,076 65

Interest on the bonded debt for the year is

442,833 75

\$5,242 90

Balance to credit of income for the year, with prior balance...

38,880 40

Balance of income

\$44,123 30

It is not easy to compare the earnings of the last with prior years, because of the consolidation and the construction of additional road between St. Joseph and the State line.

The earnings of the St. Joseph & Council Bluffs, from August, 1868, when running between St. Joseph and the Iowa line, and of the St. Joseph & Council Bluffs Railroad, after consolidation with the Council Bluffs & St. Joseph, about January, 1869, up to April 1, 1870, were \$1,081,910 08, while those of the whole property of the present company for the last year were \$1,221,937 77.

The increase of the year over those of the prior year, on the whole line, has been \$94,691 98.

The business of what was the Missouri Valley Railroad has sustained itself better than on the road northward from St. Joseph, where the business has fallen off; the result, mainly, of the completion of the Burlington & Missouri road to Omaha & Plattsmouth, with its branch to Hamburg and Nebraska City.

In conclusion, President Joy remarks:

“It is not easy to estimate the business of the present year. As has been stated, the improvement of the country along the line is very rapid. About one-third has been added to the lands cultivated in the counties through which the road runs, during the past year; and in the bottom immediately along the road probably a much larger proportion.

“The crops, both corn and wheat, are most abundant, and with prices like those of last year, the earnings of the road might safely be estimated at from \$150,000 to \$200,000, in excess. Yet, if present prices continue, it may not equal the business of last year.

“The true ground of encouragement for

stockholders is in the rapid improvement of the country and the great annual increase of production—in the fact that the railroad can do nearly or quite double the amount of business with little increase of cost, owing to its level track, and because additional business would only add to the length of freight trains without multiplying them. The rapid increase in population promotes local traffic; and although competition has divided the business of the railroad, still the prospect is not discouraging. With all discouragements the road has not only maintained but increased its revenues the past year."

FINANCES.

The bonded debt to date is.....\$5,776,500 00
Capital stock is..... 2,789,413 66

Total.....\$8,565,913 66

We condense a portion of the credit items, as follows:

Cost construction
of 260.2 miles to
April 1, 1870...\$7,504,404 23
Cost equipments,
do. do..... 533,602 79

\$8,038,007 02

Amount expended this year, per Superintendent's report:

For construction ...\$575,831 73
" equipment 130,882 85

Total.....\$706,714 57

The earnings have already been stated (from April 1, 1870, to April 31, 1871) at \$1,221,937 77.

OPERATING EXPENSES.

Service.—Train, station, water, engine and car aggregated.....\$196,861 58
Loss and damage on freight and live stock 33,290 12
Advertising, general expenses and foreign agencies 75,507 89
Repairs of every description 312,656 85
Oil, waste and fuel 72,000 05
Mail and telegraph service..... 7,404 22
Legal, miscellaneous and transfer expenses 22,074 57

Total.....\$729,802 28

being 59 893-1000 per cent of the earnings. But this statement does not include taxes or rents, or expenses of the Boston office, amounting to \$8,887 21.

As the accounts of the two companies were kept in different forms previous to the consolidation, it is found impossible to make satisfactory comparisons for the past two years.

EQUIPMENT AND IMPROVEMENTS.—The report of the superintendent, A. L. Hopkins, Esq., shows that during the year there have been added two first-class passenger coaches, two locomotives, 100 combination cars, one wrecking car. The present equipment consists of 21 locomotives, 297 passenger and freight, and 83 road cars.

On Wednesday, Sept. 27, one of Avering & Porter's road and farm locomotives was successfully run from the Waverly Fair Grounds through the city of Newark, thence by the highway to Hudson city over or rather through its wretched roadways to Jersey city, where it was steamed on board the Desbrosses street ferry boat, and finally landed on the Albany boat at pier 40, North river, to be sent to the New York State Fair, which takes place on Oct. 2d.—*Am. Artisan.*

Mobile & Ohio Railroad.

The earnings of this road for the years ending December 31, 1869 and 1870, were as follows:

	1869.	1870
From passengers, \$612,764 72	\$695,224 16	
" freight..... 1,384,402 21	1,760,072 29	
" mails..... 47,970 00	49,294 47	
" express 70,150 00	54,750 00	
Total.....\$2 115,286 93	\$2,559,340 92	
Expenses, viz:		
Repairs, roadway, \$338,770 27	\$535,502 32	
" machinery 312,534 44	449,326 10	
Transportation... 669,408 22	900,623 56	
Taxes..... 34,815 69	15,556 67	

Total.....\$1,355,528 62 \$1,910,008 65
Net revenue..... \$759,758 31 \$649,332 27

Compared with the previous year the gross earnings of 1870 show an increase of \$444,053 99, with an increase in expense of \$554,480 03, making a decrease in the net revenue of \$110,426 04. The President in his report to the stockholders says:

The Directors meet you with congratulations. Assured by the steady increase of revenue during the year that our interest liabilities were fully provided for, we determined to take a step in advance and provide also for the future. The improvement and extension of the road and the increase of its rolling stock, with a view to future business, was the question most immediately demanding the attention of your Board during the past year; and after consultation with the officers of the road we determined to expend about \$500,000 in such improvements.

The gross earnings for the year 1870 were..... \$2,559,340 92
The expenses, ordinary and extraordinary, were... 1,910,008 65

Leaving a net revenue of..... \$649,332 27

Though this is less than the amount required to pay the interest on our bonds, we have not only been able to pay that interest, but also to add 10 engines and 200 cars to our equipment; to build new shops and meet all demands promptly, with only the moderate increase of our current liabilities of say \$350,000, and that, too, without interest, being for pay-rolls and individual balances, which can be paid on presentation.

The Mississippi, Gainesville & Tuscaloosa road, commencing at Gainesville Junction on your line and running to the town of Gainesville, on the Tombigbee river, was originally aided by this company, and secured by the bonds of that company. The disasters of the war so prostrated them as to forbid the prosecution of their enterprise, and they were compelled to succumb. The entire road (21 miles), with all its property and franchises, was sold on the 20th of October last, and has been purchased by this company, and incorporated into your line as the Gainesville Branch. The importance of this purchase will be appreciated when it is remembered that by it you not only control a line running to the river, but that by an extension to the town of Eutaw, a distance of only 16 miles, through a country peculiarly favorable for the construction of a cheap road, a junction is formed with the Alabama & Chattanooga road, as also with the Selma, Marion & Memphis road, and giving us the shortest line from the West to Selma, Montgomery and Western Georgia by 35 miles.

The steady increase in your receipts since

1868, showing in 1869 an excess over 1868 of \$264,685 34, and in 1870 an excess over 1869 of \$444,053 99, and larger by \$110,054 83 than in any former year, while the first three months of the present year show an excess over the corresponding months in 1870 of \$180,427 09, is convincing proof of the steady improvement of the country tributary to your line. While the cotton crop of 1870 was much larger than that of the preceding year, the tables will show that your increased receipts are not alone due to the traffic derived from that staple.

Overworked Railway Employees.

It would be interesting to know how many railway disasters have happened from the overtaken energies of employees giving out by too long continued application. Engineers, switchmen, and signalmen, upon whose care the safety of the traveling public so much depend, ought no more to be overworked than machinery should be overtasked, or a bridge overweighted. It is poor economy in both cases, and dangerous to the last degree. One very fatal disaster has taken place within a year in this country on the New York Central Railway, caused by the sleepiness of a locomotive engineer, who had been on the foot-board of his engine over seventeen hours on a continuous stretch. There is no employment where the men require the full possession of their faculties in a greater degree than in the details of railway operation. They can not be expected to possess these, if they are kept at any employment for so large and disproportionate a share of the twenty-four hours; and although exigencies do arise in the service where the men are compelled to be thus overworked, yet it is always accompanied with great hazards, and at the imminent risk of fatal results. Long continued employment in one thing becomes monotonous, and even if the employment is hazardous, the endurance of the men can not safely be depended upon if the well known laws governing health are constantly violated. Who would wish to entrust his person on a train of cars, the engineer, or conductor, or brakemen of which had been on continuous duty sixteen or seventeen hours? and we all of us would be very unwilling to venture upon a road where the signalmen are thus overworked. This matter has attracted a great deal of attention in Great Britain, where probably the evil exists in a greater degree than in this country: but it is well for railway managers here to give the matter their earnest attention, so as to escape the inevitable results of a wrong practice. There is a safe limit to human endurance, as well as a safe limit to the pressure on a boiler, or weight on a bridge. A member of the British Parliament has recently drawn the attention of the officers of the principal railways to the number of continuous hours some of the railway employees are on duty. One locomotive engineer was on his engine ten hours and ten minutes; once, eleven hours; once, eleven hours and forty minutes; once, twelve hours; five times, over twelve hours; nine times, thirteen hours; three times, over thirteen hours; three times, fourteen hours; three times, over fourteen hours; three times, fifteen hours; three times, over fifteen hours; four times, sixteen hours; eight times, over sixteen hours; five times, seventeen hours; four times, over seventeen hours; once, eighteen hours; twice, over eighteen hours; once, nineteen hours; once, twenty hours; once,

twenty-two hours; once, twenty-four hours; once, twenty-eight hours. The same gentleman says he has had communication with other train hands that have been on continuous duty still longer—several who have been from eighteen to over forty hours with their trains, and with some who have been with special and other trains for a whole week without having their clothes off. He speaks of signalmen who were on duty twelve hours each day, without any time being given for taking their meals; others who had worked as high as eighteen hours continuously, and many others who were on duty from twelve to seventeen hours daily; Sundays included.

If this practice is general on the English railways, we think that country would be a very proper place for missionary labor—Christian and humanitarian included. Advanced civilization results in getting up societies for the prevention of cruelty to animals; when it advances a step further, it will make a proper effort for the protection of the human animal employed in railway operation. Where men are thus outrageously overworked, is it any wonder that disasters occur, that trains run into each other, that boilers are burst, and that trains run off the track? The public can never expect to be carried safely while any such practices are allowed, and any company allowing them to exist would be amenable for the results of accidents or disasters occurring therefrom, as from the use of unsafe materials. Men and material must be considered alike in railway management; they ought not to be made to do duty beyond the safe limit of strength, common humanity and common prudence suggesting that limit.—*Railway Times*.

Wooden Railway in Canada.

A wooden railway on the 4-feet 8½ inch gauge is being constructed from the town of Sorel, at the confluence of the Richelieu river with the St. Lawrence, through Drummondville, to Arthabaska, Province of Quebec, by Mr. L. A. Senecal, contractor. The *Montreal Herald* gives a long account of a recent trip on the line. Upwards of 2,000 men were at work, and the rails are laid on a large portion of the road. An experimental trip was made, the train going at the rate of twenty-five miles per hour, and running with remarkable smoothness. The journal quoted furnishes the following particulars: "The ties, which are of hemlock and tamarac, are now brought down on trucks from the woods through which the railway runs; they are put on a rollway, run up to most ingenious circular saws, so gauged that at one operation they are mortised the proper depth and distance, not the difference of a hair breadth being found between one and another. As fast as they are cut, and the operation is very fast indeed, the prepared ties are rolled over to a different siding from that on which they are received, an ordinary circular saw sides them, and they are loaded up to be run out to the place where they are wanted. The wedges for laying up the rails are also prepared here. The rails are of maple, four by seven inches, and fourteen feet long, the gauge of the line being 4 feet 8½ inches. The cost of the line, in which cost are included stations (nine in number), car and locomotive depot, engine and repairing shops, engine and tender, two passenger cars, eight grain cars, and twenty-five wood cars, is \$5,000 a mile, in full for all but the Yamaska bridge, which cost \$35,000. It should be mentioned that land damages, fences, etc., are included, also, in this amount.

Accidents to Railway Structures.

[From a paper read before the American Society of Civil Engineers by Mr. Thomas C. Clarke.]

Railway accidents may be roughly classified as follows:

I. *Running off the track* from breakage of parts of engines or cars; breakage or displacement of rails; malicious or accidental obstructions on the track.

II. *Collisions* from disregard or misunderstanding of signals; overcrowding from badly arranged time tables; misplaced switches; accident to train on one track, throwing it in the way of train on the other.

III. *Failure of structures* from decay or original bad design; shocks from breakage of machinery, causing trains to run off track while crossing, or from collisions on bridge.

It has been observed that the most disastrous accidents have resulted from an unforeseen combination of two or more of the above causes. The late appalling accident on the Hudson River Railway is an illustration of this, as it was a combination of all three of the above principal causes.

The primary cause was the breaking of the axle under the oil car. According to the evidence of Mr. Tincey, superintendent of the railway, broken axles have been known to run twenty miles before being discovered, "the frozen ground keeping it up; in this case it evidently dropped through the bridge." The second cause, therefore, was failure of a structure from shock caused by breakage of machinery. This threw the car from one track over upon the other, and a collision resulted, aggravated in its consequences by the presence of petroleum, and from its being upon a wooden structure which quickly burned down.

Much severe criticism has been passed upon the company, because the "safety signal," as it is said, "lured the train to destruction." It appears to have been overlooked that the same unhappy result would have followed if the signal lamp had been entirely removed, when winter changed the bridge from a movable draw to a fixed structure. Moreover, a collision would have taken place on a fixed bridge where there never was any signal if the broken car had happened to cross one. In fairness to the employees of the railway, the accident should not be attributed to a disregard or misunderstanding of signals. The combination of a broken axle, a bridge, a car laden with petroleum, an express train coming up at the same moment, were all required to cause this dreadful event.

The object of the present paper is merely to consider one of these points, and to discuss the questions, whether bridges as now constructed are sources of danger, and, if so, can the chances of accident therefrom be reduced by different forms of construction?

It is believed that there is no instance of a bridge, designed by an American civil engineer, having broken down from bad design, or insufficient material, as did the Dee bridge in England, designed by Robert Stevenson.

All the bridge accidents in this country, it is believed by the writer (and if mistaken he hopes some member will correct the statement), have occurred either from the falling of temporary trestle work, or from weakness caused by decay, or from sudden shocks occurring when trains have run off the track. Our bridges, both of wood and iron, are safe so long as the trains remain upon the track. How many of them are absolutely safe under all circumstances? If not, how can we make

them so? or at least diminish the chances of accident? This is the practical question.

It was a practice in English bridge construction, introduced by Brunel, and now falling into disuse, to make the platform of a bridge in the shape of a trough, which was filled with gravel or broken stone ballast, and the ties laid in it, just as on earthworks.

The reasons given by Mr. Brunel for this were as follows:

1. To enable the alignment and level of the rails to be maintained by the same men and with the same tools as on other parts of the line.

2. To prevent concussion when a train came upon a bridge, as there was no change in the nature of the support given the rails.

3. To prevent vibration being transmitted to the ironwork of the bridge.

4. In case of trains getting off the rails, to prevent their plowing through the flooring.

5. To protect timber flooring from fire.

6. To provide for changes of length caused by temperature.

7. To increase dead weight on short spans so that there might be no jar from the rapidly applied load of a locomotive.

It was Brunel's belief that the cost of the extra material required to support the ballast was more than compensated by the above advantages.

Most American engineers would say that the first object was of little consequence; that the second and third are equally well provided for by a wooden system of flooring; that to use ballast for the fifth would do more harm than good, because the timber and plank would rot unseen; the sixth can be accomplished more easily in other ways; and that the seventh had better be attained by making the ironwork heavier. The fourth, that of preventing trains plowing through the floor, ought to be accomplished at any cost. But let us examine if there be not a better way.

The weight of the ballast itself averages about 500 pounds per foot run, and that of the additional parts of the platform necessary to support it about 500 pounds more. In other words, it weighs as much as the ironwork of an American truss bridge of 150 feet span, or an English plate girder of 110 feet span. This great addition of dead weight has prevented its adoption here, and caused its disuse in England. The object which it was intended to accomplish was excellent, and it is to be feared that this has been too much neglected in the rough and ready style of construction adopted in our earlier bridges at least.

If the train jumps the track while crossing, it falls through a space equal to

The height of rail.....	4½ inches.
" track stringer	12 "
" cross tie.....	5½ "
	22 inches

in all upon the floor beams, which, in most cases, would either be broken outright by the shock, or crowded apart by the wheels of the engine, so that it would drop through the bridge.

The arrangement of platform on most iron bridges is still more dangerous, as the floor beams, though of iron, are placed in pairs together, and from 10 to 15 feet apart, so that there is nothing to prevent the engine from dropping between them if it once leaves the rails.

There is a mode of construction which is in use upon some of the Pennsylvania coal roads, which is much better provided to secure safety

in the case of trains leaving the rails. The track stringers are numerous, and are strong enough to resist a severe shock. The ties are made of 4x12 inch plank, on edge, placed 6 or 8 inches apart, and blocked between every one, both at each end and under the rails. It will be observed:

1. That the distance that the wheels can fall can not exceed the height of the rail, or 4½ inches.

2. That the platform is broad enough to support the wheels even if the train is off the track.

3. That the ties are so close that the wheels can not drop between them, and being firmly blocked, can not be crowded apart so as to leave a space through which a car or engine may fall.

In addition to this, there should be heavy guard timbers on each side, to prevent the engine striking the trusses of the bridge before its motion is arrested. There should also be a few planks spiked together lengthwise, so as to support the track in case of an axle or wheel breaking.

If such an arrangement does not insure perfect safety, it certainly diminishes the chances of danger far below those which are inseparable from the style of construction which it is believed is commonly used in this country.

As the one object of bridge building is to insure the safety of what is carried across the bridge, it would seem desirable that some of the superfluous talent which fills our engineering papers and magazines with elaborate calculations upon the strength of the parts of the main trusses of bridges, none of which were ever known to fail, should be diverted to drawing the attention of railway managers to a safer construction of the floor system than now prevails.

PHILADELPHIA INDUSTRIES.—A Philadelphia paper states that in that city there are eight thousand establishments in which persons are employed at wages in productive or manufacturing industry; and the value of this product for the current year can not be less than three hundred and fifty millions of dollars. It was three hundred and twenty-five millions for the year ending June 30, 1870, and it is at least ten per cent. greater for this current year (1871). A hundred thousand men and forty thousand women find steady employment and liberal wages in this industry, receiving no less than sixty millions of dollars in money for their labor in the course of the year. And of this product of three hundred and fifty millions of exchangeable merchandise, not less than one hundred and fifty millions in value go to comparatively distant markets to be consumed, bringing back a net revenue in money and valuable exchanges immense in their aggregate amount.

Eighteen hundred of these factories are driven by steam power, the aggregate of this power being that of fifty thousand horses. This is not large in proportion to the number of establishments, but it is a respectable adjunct to the one hundred thousand men and forty thousand women whose labor is employed. Looms, spindles, lathes, planes, and steam-driven machines of a hundred sorts number in all more than two hundred and fifty thousand, and by their aid one man now makes nearly twice as much in value as in 1860.—*Artisan.*

Rich tin mine samples, assaying forty per cent, have been discovered near Ogden, Utah.

New Atmospheric Brake.

The Pittsburg & Connellsville Railroad Company have been trying a new air-brake. It is called the Smith patent, and is claimed to be a better one than any now in use. A description of this apparatus, which it is asserted, can stop in a few seconds a train of cars at full speed, is as follows:

On the right-hand side of the locomotive, fastened to the running-board, and under the inspection of the engineer, is an upright, direct air pump which is operated by steam supplied from the boiler, and pumps air into a reservoir hanging under the cab of the locomotive. This pump is entirely self-acting, and whenever there is a deficiency of pressure in the air-reservoir it commences working until the equilibrium is restored. Under each car of the train is a cylinder firmly bolted in such a position that its piston acts directly on the lever used for the ordinary hand-brake, but does not at all interfere with its use by hand.

The pressure of the air is conducted to these cylinders from the reservoir under the locomotive by a line of gas-pipe, three-quarters of an inch in diameter, running the entire length of the train, and the connection with one cylinder is made from the main line with an elbow one-quarter of an inch in diameter. From each end of the car the pipes are extended by three-ply rubber hose, which are connected when the cars are coupled together. Should a car become detached, the valves of the coupling immediately close, the brake continues applied, and the car is prevented from running back on a grade. An air-gauge placed immediately above the steam-gauge indicates to the engineer the quantity of pressure in the reservoir, and the management of the train is placed in the engineer's hands by means of a three-way cock.

At a recent trial of this brake on the Missouri Pacific Railroad, a train, 300 feet long, traveling at a speed of 34 miles an hour, was stopped in 20 seconds, at a distance of 1,000 feet from the point where the brake was applied. The train traveling at the same rate was subsequently stopped by brakemen with a hand-brake; but 45 seconds were required, and the cars continued in motion for 1,750 feet.—*Exchange.*

Railroad Items.

At a meeting of the stockholders of the Ohio & Mississippi Railroad, on the 12th inst., in this city, Daniel Torrance, and Allan Campbell of New York, were re-elected directors, and Albert N. Christie elected director in place of W. D. Griswold, who declined a re-election. These gentlemen were elected for four years, three directors in this company being elected annually. At a meeting of the board held subsequently Daniel Torrance was elected president, and A. N. Christie vice president for the ensuing year.

The Hannibal & Central Missouri Railroad, built in the interests of the Toledo, Wabash & Western Railway, is now open from Hannibal to Moherley, on the North Missouri Railroad, and arrangements are in progress, which will secure the passage of through cars from Kansas City to New York, via Hannibal and Toledo. This new route will be seventy miles shorter than that via Chicago, and seven miles shorter than that via St. Louis and the lines controlled by the Pennsylvania Railroad Company.

Trains are now running on the Michigan Lake Shore Railroad from Muskegon to Kalamazoo, a distance of 86 miles. Close connections are made at Kalamazoo with trains of the Grand Rapids & Indiana, and Michigan Central Railroads, and at Allegan with Kalamazoo division of Lake Shore & Michigan Southern.

The tracklayers on the Northern Pacific Railroad laid three miles of track September 28, and are rapidly approaching the Red river. Workmen will begin immediately on the Dacotah division, 200 miles of which is under contract.

Trains on the Burlington & Missouri River Railroad, in Nebraska, are now running 40 miles beyond Dorchester, the former terminus. There are three stations on the extension now opened—one 15 miles, the second 31 miles, and the last 40 miles from Dorchester—but no names have been fixed for the stations.

Bids for building the bridge across the Missouri at Leavenworth, Kansas, were opened recently. The successful bidder was B. Boomer, of Chicago, his bid being \$850,000 for the bridge complete, including the approaches, the bridge to be finished within twelve months. Gen. W. W. Wright will be chief engineer.

Trains are now run on the Gilman, Clinton & Springfield Railroad from Gilman to Mount Pulaski, a distance of 87½ miles, and it is expected that the whole line through to Springfield, Illinois, will be completed during current month.

A railway is to be carried to the top of the Swiss mountain in Righl. It is already opened to the height of 4,000 feet.

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The Railroad Record.

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A Continued View of Railroad Operations and their Results.

In our last two articles we have endeavored to give a view, not merely of the increase of railroads in this country, but of the relative increase of their business and their profits. Whoever has read those articles will be convinced that the idea that railroads taken in the aggregate are not profitable is a delusion; and will be equally convinced that the future of railroads is most brilliant. If, as we have shown, the business of railroads increases much faster than the population of the country, if each year gives a certain fixed increase to that business, and if this increase gives a pro rata profit, increasing faster than the increase of business, then it follows inevitably that if a railroad in a growing part of the country yields only 4 or 5 per cent. this year, it will in a very few years yield 10 or 12. We may illustrate what we have said and proved in former articles by the following table:

	Cost.	Gross recs.	Expenses.	Net.
Railroad A in 1870	\$1,000,000	\$100,000	\$60,000	\$40,000
“ “ 1880	“	180,000	108,000	72,000
“ “ 1890	“	200,000	156,000	104,000

The profits of the road are:

In 1870.....	4 per cent.
In 1880.....	7.2 “
In 1890.....	10.4 “

This gives more than 7 per cent average in the 20 years; and hence the road at the end is one of the most profitable pieces of property in the country. This is the average increase in business and profits, as determined

by our tables, and we believe the average results of those tables are a minimum. A more detailed examination would, we think, give even better results. But in the above table we have assumed only 4 per cent. as the present net profit. In fact, two-thirds of the roads of the country yield more than 6 per cent. Let us take 6 per cent. as the present net profits, and taking the known elements calculate the result in 20 years. It is this:

	Cost.	Gr. recs.	Expenses.	Net.
Railroad A in 1870	\$1,000,000	\$150,000	\$80,000	\$50,000
“ “ 1880	“	276,000	162,000	108,000
“ “ 1890	“	390,000	234,000	156,000

The percentage of dividends then would be:

In 1870.....	6 per cent.
In 1880.....	10.8 “
In 1890.....	15.9 “
Average.....	10.8 “

While the stockholders on this road have been receiving an average of 10 per cent., they find it yielding 15 per cent. at the end of twenty years. This is no more than some roads in this country have done, and no more than full half of them will do.

Now we have shown in former tables that the present net receipts of all the railroads in this country is 7½ per cent. Make ½ per cent. a contingent fund, and take 7 per cent as the present profit on \$2,400,000,000 (two thousand four hundred million dollars) invested in railroad property in this country; what then is the result of twenty years' operations? It is this:

Am'n R. R.'s in	Cost.	Gross recs.	Expenses.	Net.
1870	\$2,400,000,000	\$420,000,000	\$252,000,000	\$168,000,000
1880	“	756,000,000	453,600,000	302,400,000
1890	“	1,092,000,000	655,200,000	436,800,000

This gives 18 per cent. on all existing roads at the end of 1890, and 12½ per cent. average dividends on all existing railroads for the next twenty years. If no more railroads are made this will be the sure and inevitable result; but railroads are making at the rate of 6,000 miles each year, and we imagine that some of these will compete with others. But we have no reason to believe that what has been the experience of ten years of railroading, in which some unnecessary roads have been made, and a very extravagant expenditure of money, will not be at least as favorable in the next ten years. On the contrary, we believe that it will be much more favorable. We have no more a great war on our hands, nor any prospect of any. Hence, we think the results of the next ten years will be much more favorable.

It may be objected, how do you know that the progress of railroads and the increase of railroad business will be as great as they have been? Our evidence is experience, and that experience has been so uniform that we have no reason to doubt that it will continue, at least for many years to come. For example, the population of the United States has increased since 1790 (now eighty years) at a uniform rate of 33 per cent. each ten years. The war reduced that rate something in the

last decade; but immigration is now fast increasing, and population increasing probably as fast as ever. The rate will not seriously diminish till our new lands are exhausted, and that will not be till at least another generation has grown up. The population, then, being supposed to continue at the same rate, we have already shown that the business of a completed railroad in full operation increases about 8 per cent. each year, or about 80 per cent. in ten years, and that this is the inevitable result of increased production; for after the wants of a people are supplied, all raised over that is surplus, and that surplus makes the tonnage of railroads, and therefore adds as much each year to the business of the roads. In the same manner increased population and business increases wealth, and with it the number of passengers. Thus it is not difficult to see that the existing railroads must increase immensely in both business and profits. But there will be new railroads built, what is the prospect for them and the capital invested in them? There will be many new roads, and there ought to be; but the same reasoning applies to them, except when they have been foolishly and unreasonably built in direct contact and competition with other roads, and that we do not suppose. Some of the new roads now about to be made, such as the Great Northern, will pass through a fertile country, fast increasing in population, and not sufficiently near any other road to meet with serious competition. Such roads will, when completed, begin with a fair business and be certain to increase it until it yields 12 or 15 per cent.

This is the inevitable conclusion from the facts we have stated, and which can not be controverted, because they result from the unimpeachable evidence of railroad experience.

— Upon the application of James E. Tyson, of Baltimore, an injunction order has been granted by the United States Circuit Court, prohibiting any consolidation of the Virginia and Tennessee Railroad Company with other roads, and the issuing and selling of bonds and securing the same by lien upon the stock. The order will be heard on the 20th inst. The charge is that the President and officers propose to issue bonds to the amount of eight millions, securing the same on the consolidated roads and their earnings, including the Virginia and Tennessee, South Side and Norfolk, and Petersburg roads, under the name of the Atlantic, Mississippi and Ohio Railroad Company.

— Don Cameron and other Pennsylvania capitalists have bought the Blue Ridge Railroad, South Carolina, and upon the recommendation of Col. J. P. Low, their chief engineer, have resolved to change the gauge to three feet throughout the entire line. The seaboard terminus of the road will be at the port of Charleston. The engineer's estimates indicate that a business which would pay only 3 per cent dividends if the road be completed on the broad gauge plan will suffice to pay 7 per cent on the cost of the narrow gauge.

An "Open Letter" from Edward D. Mansfield, of Cincinnati, to Edward Atkinson, of Boston.

MORROW (Warren Co.), Ohio,
October 17, 1871.

MR. EDWARD ATKINSON,

Dear Sir:—I am obliged to you for calling my attention to your able and interesting article on the tariff, in the *Atlantic Magazine*. I have no personal interest in either commerce or manufactures, and am afraid that the conductors of periodicals will find no profit in publishing my articles. I am only interested in behalf of the small farmers and workingmen who make up three-fourths of the voters, and whose direct interest it is to maintain the tariff at the highest revenue point, which, if it be properly arranged, will be protective. I have read your article with as much care as I had time for, and hope you will pardon a few cursory notes.

1. I was charged with not knowing what "free trade" was, and I asked for a definition. I don't think you have given it, except in the very way in which I understood it to be—the abolition of restrictions upon trade. Page 461 (of the *Atlantic*), you say "There must be the utmost liberty in making exchanges." When I affirmed that this was free trade, it was denied, and I am glad to see that, so far as the broad principle is concerned, we understand it alike. According to this theory of non-restriction, one dollar of a tax on trade is a restriction. To this ultra extent no nation has adopted the theory of free trade, and probably none ever will. If you admit the right of the Government, either moral or political, to levy one dollar on trade, you admit its right to levy whatever it may deem expedient. It becomes a question of expediency only. And now to the principle: I deny that it is either right or expedient to admit unlimited free trade with foreign nations. In this vast continent, four times as large as Great Britain, France, Germany and Italy, we can and ought to raise and make everything we need, except, perhaps, coffee and spices. If we can, then what need of free trade with foreign nations? Free trade in ideas and people we have, and, therefore, there is no danger of our not having intercourse enough with the world. To begin at the very beginning, I am opposed to unrestricted free trade with foreign nations; and so was Jefferson, and Madison, Hamilton and Wolcott, Clay and Lincoln. I do not think that authorities settle principles; but I do believe that these distinguished statesmen understood the nature and condition of their country as well as we do.

I am not opposed to free trade in order to protect our infant manufactures, for our manufactures are no longer infant; nor am I very careful to protect large capital in manufactures, for capital will take care of itself. There are some *factures* (as you properly call

them) in which the capital does need protection and the laborers. I am opposed to unrestricted free trade with other nations, because I wish to develop American industry; because I wish to keep the American laborer in his present good condition; and because I don't believe swapping jackets with foreign nations is the best kind of business. Here I must turn one moment in what you think the elements of political economy. Your article is evidently based on the idea that *commerce* is the great end of political economy. But you are well aware that the greatest writers on political economy are not agreed to that. Nay, they are not agreed upon anything which may be regarded as axiomatic or vital in political economy. The system to which you are attached was chiefly advocated by the Italians, and probably had its origin in the splendid commerce of Venice and Genoa. The French economists hold wealth to arise from land, a very opposite system to the mercantile. Adam Smith, the greatest of English writers, places wealth in the products of labor, but he is not very definite, and says, "that the real wealth of a country consists in the annual produce of the land and labor." You see that commerce is not considered by the greatest of economists as the chief source of wealth. Wealth itself is simply the *surplus* of production over consumption.

You say (on page 460), "The most ample consumption of every article called for by men, at the cost of the least possible effort to obtain it, is the end sought by the free trade economist." If this definition is to be taken literally, then the fire at Chicago was attaining the great end of free trade economy! for certainly it was a most ample consumption, and it will require much production and much commerce to replace it. This, too, is strictly consistent with the commercial theory of free trade, because that theory assumes that commerce is the great end to be attained; but in fact consumption is *not* the end to be attained, as you will admit, when you consider that the consumption of products may be doubled and yet no surplus remain. Consumption is simply destruction, while the real end of economy is to *save a surplus from that destruction*. I maintain that the increase of National Industry is the best means of increasing a surplus, which constitutes national wealth.

I merely cite these principles of political economy here, to show that the questions at issue do not refer merely to details of a tariff (which I dare say are often mistaken or erroneous), but to the greater question of national economy. Now let me return to the practical questions of the day, in which those who read or talk on this subject are chiefly interested.

2. It can not be denied that a tariff on foreign merchandise is an *indirect* tax; that is, I am not obliged to wear foreign cloths, nor even to wear broadcloth at all; consequently,

I am not obliged to pay any tariff on broadcloth. When you tell me it is a tax, I reply that it is a tax I am not obliged to pay, while the tax which the State of Ohio levies on my house and land I am obliged to pay. Now I prefer an indirect tax, where I have some freedom of choice, to a direct tax on property. Further, I wish that every dollar of public revenue was raised from the tariff. You admit, and all sensible men do, that the government must have a given sum of money in order to pay its expenses and maintain its integrity. If so, then the only question is, *how* shall that money be raised? You give up all your definition of free trade; you admit that the government must raise a large sum by the tariff. We quit, therefore, the whole field of abstract political economy, of free trade and of commerce, and come square down on the fact that we *must* raise a sum of money by the tariff. Accordingly (on pages 478-9) you have given a budget, by which you propose to raise \$235,000,000—an amount which I think, after this year, will perhaps be sufficient. Of this, you propose to raise \$110,000,000 by the tariff. This gives up all idea of free trade as you have defined it, and brings us down to the sober realities of the situation. But when we come to the *how* of raising this great sum, I differ from you as much as on general principles. You propose to keep no less than \$50,000,000 tax on coffee, tea and sugar. This is the heaviest tax laid on farmers and workmen of any in the whole list of tariff duties. Investigate the subject, and you will find it so. But, continuing this tax is only half the burden you propose to lay on farmers. Take, for instance, the farmers of Scioto, Lawrence, Gallia, Jackson, Vinton, Athens, Meigs, Washington, Muskingum, Montgomery, Mahoning, Trumbull, and many other counties in Ohio, where do they sell their surplus products, which is their wealth? They sell them to the workmen in iron. But, in order to get the tariff down to \$110,000,000, you kindly propose to take the tax off from foreign iron, but leave it on their comforts and necessities! To me, this is monstrous. What effect will taking the tariff off from foreign manufacture have? Either the quantity of manufactured products will be reduced, or the wages of the laborer will be reduced. I am opposed to either result. The capitalist will take care of himself; but what will become of the laborer? You say that the object is to increase consumption, and that is done by cheapening the cost. The central idea of free trade is to cheapen, and it is utterly impossible to cheapen American manufactures without cheapening American labor, and reducing the condition of laborers to something near that of those in Europe. That I do not wish to see.

3. I now call your attention to some statements of fact and illustration. On page 463, you refer to locomotives and cars, the materials of which have high tariff duties upon them

This is true; but I am informed by an eminent railroad man that he can buy locomotives as cheap to-day as before the present tariff was laid; and, moreover, we actually export locomotives and cars. This illustration, therefore, if it have any weight, is most decidedly in favor of the present tariff.

Again, on page 469, you give a table of the number of sheep in Ohio—which table, by the way, has been going through the papers, as if it meant anything. Now what was the fact?

Sheep in Ohio in 1860.....	3,368,174
" " 1870.....	5,052,028
Increase .....	.46 per cent.
Increase of population.....	15 per cent.

Don't you think the sheep increased fast enough? but you take intermediate years, and find that in 1867-68 sheep were much more numerous—compare by them. Do you not know that in the war there was a sudden and great demand for blankets and woolen clothing, which stimulated all forms of woolen production? This was the simple fact, and sheep and wool are now merely returning to their normal condition. That is all of it. But your idea is, that if the wool duty were taken off, we should import more foreign wool, and thus aid the American manufacturer. I had the curiosity to look into this, and the result is exactly the contrary. Take the following importation of wool into this country:

	Pounds.
In 1859, before tariff of 1863.....	4,000,000
" 1860-1, " "	5,000,000
" 1870, " "	49,000,000

The tariff has not obstructed the importation of a pound of wool, but it has enabled the government to raise a revenue from it, where it raised little or none before. The farmers may demand a higher tariff, but they will not accept a lower one.

4. The purchasing value of labor in Europe is not, as you suppose, two-thirds of what it is in this country, but only half. This is proved by Wells' Tables, but much better by Mr. Hewitt's Report, who is by far the best authority.

You allude to the small cost of manufacturing cotton cloth. This may be so, but it is the exception to fabrics in general. Take an average of iron, wood, woolen and other manufactures, and you will find that the cost of labor is far the greatest part of the whole. Even so simple a thing as pig iron (which some persons absurdly call a raw material) is in its production three-fourths labor, and you will observe that reducing the duty from \$9 to \$7 per ton has already much increased the imports.

5. Perhaps I ought to stop here; but I will notice some of the misrepresentations in the same number of the *Free Trader* which contains your article. For example, they declare that ship building has declined, and do it by contrasting alternate years. This is one of the

examples which the free traders are fond of handing round, and I am equally glad to show up. Now the fact is that ship building, in a fair sense, has *not* declined; and I submit for proof the reports of the Bureau of Statistics. Ship building refers to all those kinds of vessels which are built to go upon the ocean. These are of several kinds. One of them, and that the least class (ocean packets, or ships technically) has declined, while the aggregate tonnage has increased. The present tariff was enacted in 1863, and has been amended since. The following table gives the tonnage of ship building before the tariff, and since the present tariff, excluding canal boats, sloops and steamers (not ocean):

Number of brigs, ships, barks and schooners built in 1860, '61 and '62, do. in 1868, '69, '70.....	1,319
Increase in number.....	653

The increase of tonnage is nearly or quite as great. This is an increase of nearly 50 per cent. in the real ship building of the country. But the free trader says, "the ships" have declined. Very little, and let us see why. The building of the largest class of ocean ships declined in the years I have mentioned in the ratio of 282 to 244, which is 15 per cent. Why? Because iron and labor are on the Clyde at half the cost that they are in this country. While that remains a fact, you will not increase ship building if you abolish the whole tariff.

Take another example. The *Free Trader* says that iron was \$27 per ton, and is now \$37 per ton. I suppose it means to say that the tariff raised iron \$10 per ton. In 1859-60 pig iron ranged in the Cincinnati market from \$26 to \$36, averaging about \$30. In the last two or three years it has been at times as low as that. I might pursue these special examples to any length; but I should only be pursuing the tortuous windings of ignorant error. And now do you think the intelligent gentlemen of the Free Trade League can gain anything in this enlightened country by misstating facts? I should advise them to look the truth in the face and say that, "according to the theory of free trade it is better to lay direct taxes on our lands and houses than to put any restriction on trade; it is better to buy broadcloths and carpets cheap than to encourage American farmers to raise sheep, or American laborers to live comfortably; it is better to tax the farmer for the comforts of his life, than to raise up a market for his products; it is better to encourage "consumption" which destroys, than it is to encourage industry, which creates wealth." This is the real theory of free trade put in plain terms, and I confess that I see nothing either pleasing or profitable in that theory. Let me say, that if *success* does not always prove the merits of a man, it does prove the merits of a system of economy. Since the war closed, under the present tariff

and currency, we have been successful beyond all precedent. Our currency is uniform; our commerce with foreign nations has greatly expanded; our factories are active and productive; our mines of iron and coal are yielding wealth beyond those of gold and silver. So far as material interests go, this nation is greatly prosperous. In this state of affairs, I ask why should we change our policy? Is there any better rule for any of us than to be satisfied with "well off"?

No one need be troubled about getting any reasonable reduction of taxes. Congress will without doubt reduce the tariff raised on many articles, and reduce all taxes to the needs of an economical administration of government; but I trust and believe that Congress will never repeal the policy of protection, so far as it can be had by discriminating duties, and that no legislation will diminish the rewards of American labor.

Let me say that political economy can never become a science till statistics has first become a science. Statistics are the premises on which political economy reasons, and without premises (that is, axioms), how can there be a science? When a writer says that land or labor or commerce are the sole source of wealth, we ask why? How do you demonstrate it? Each one comes, like a theologian, with his dogmas on trade, and is very much astonished that you are not convinced! Why should you be if he gives you no facts, no premises? The *facts* of society, just as it exists, are the premises. *Statistics* are prior to political economy. The *needs* of society are prior to any philosophy.

In conclusion, I may say that I am clearly convinced that the best interests of the farmers and workmen of this country will be promoted by at least a moderate protection of American labor; that the tariff is the best form of taxation; and that we have no interest in extending foreign commerce beyond its present bloated and enormous magnitude.

I am glad that you and other thinking men are examining this subject, and hope that our beloved country may reap benefit from your labors.

Yours respectfully,

E. W. D. MANSFIELD.

In an article upon the merits of the Atlantic, Duluth & Pacific line, published last month, it was stated that the China, a new steamship of that line, had been built at Buffalo with capital furnished by the Pennsylvania Railroad Company. A letter from Jos. D. Potts, president of the Erie & Western Transportation Company, says that this statement was erroneous, and that the whole capital for building the new vessels, as well as for the purchase of other steamboats, also for the construction of wharves and elevators at Erie, has been furnished by the Erie & Western Transportation Company, who owns the stock of the Atlantic, Duluth & Pacific line.

KENTUCKY RAILROAD INTERESTS.

Kentucky & Great Eastern Railway.

ITS GREAT NECESSITY.

SPIRIT OF THE CANVASS!!

Obstruction to Trade and Travel by Low Water—A Railroad Necessary.

[From the Maysville Bulletin.]

The continued low stage of water in the Ohio river has rendered navigation irregular, difficult, and to many of the packets, impossible. It not only is exceedingly inconvenient to travelers, but a great drawback to commerce along the whole line of the river. Immense quantities of heavy freight, iron, coal, merchandise, &c., are awaiting transportation, above and below, to the great detriment of private interests. Between this place and Cincinnati the tide of travel is to a great extent thrown upon our railroad, through Carlisle and Paris, down the Kentucky Central. If the Maysville road were now completed to Paris, it would not only be passengers who would avail themselves of that means of communication between Maysville and Cincinnati, but business men would order much of their freight to be brought and sent over that route. We have never seen the Ohio river at a lower stage at this season of the year than it now is. From well known natural causes, the opening up of the country, the exposure of the earth's surface by the clearing away of the forests, the volume of the water which flows down the river has for some years steadily diminished. High floods in the Ohio are not as frequent as they were twenty or more years ago. There is good reason to believe that navigation on the river will not in the future be better than it has been for the last few seasons. A railroad upon the river is, therefore, a great commercial want, a necessity which the business men interested feel every day, and none more than those engaged in the manufacture of iron and the mining of coal in the counties above. Immense quantities of these articles are at the river bank in Greenup and Boyd counties, and have been there for months awaiting shipment, and which can not be sent away until the river rises. These articles, especially coal, are greatly needed in all the country below. The manufacturing interests of Newport and Covington have been suffering for weeks for want of supplies of coal, and, perhaps, iron. With a railroad along the river bank they need suffer no such inconvenience for more than a day.

The state of things we have described above as resulting from the innavigable condition of the river, demonstrates the wisdom of the action of the people of Mason county on Saturday last. They have shown a just appreciation of the public wants, and voted with surprising unanimity in favor of building a road which will make business independent of the vicissitudes of the river.

North-eastern Kentucky,

The Greenupshurg *Independent* has recently contained several interesting articles upon the subject of the development of the great mineral riches of that region of the State. It takes an intelligent view of the subject, and invites immigration and capital to come and seize the opportunity of realizing wonderful profits from the vast mines of wealth which lie un-

developed all around. Nothing will contribute more to bring about the end desired by the *Independent*, than the completion of a line of railroad running up and down the Ohio river, and giving to the people of Greenup and the adjacent country connections with the business world both in the east and west. Such a road will be invaluable to that part of north-eastern Kentucky, and will not long leave the coal fields, iron banks and timber fields which so abound in that region, uninvalued by capital seeking profitable investment. We therefore hope soon to see our worthy friend of the *Independent* earnestly engaged in arousing the good people of Greenup county to the work of aiding in the great enterprise in which Mason county has just given so signal an evidence of her appreciation. The people of Greenup county, who are so richly blessed with resources to be made available by enterprise and capital, can not afford to lose by indifference this splendid chance of having a road which will be the very best instrumentality of realizing their highest wishes. They must help, according to their ability, to make the road, and the spirited editor of the *Independent* can not better serve the people of Greenup, than by earnestly preparing them to vote a moderate subscription to the capital stock of the Kentucky & Great Eastern Railroad.

[From the Maysville Republican.]

The people of Mason county have spoken at the polls, and by a handsome majority have said they desire a railroad from Newport to Catlettsburgh, and that they are willing to put up their money to aid in building it, but they must not sit quietly down and take it for granted that their work is done. Before we can secure this great work, other communities are to be consulted and if possible induced to vote their money to aid in its construction. Without their aid the road can not and will not be undertaken. If they vote their money the speedy completion of the road is secured. We are informed that the counties of Boyd, Greenup and Lewis will be immediately requested to vote appropriations in aid of the enterprise. The business intercourse between the people of Lewis and Mason is frequent and friendly, and every friend of the road in Mason should use his influence with his Lewis county friend and if possible induce him to vote for the proposition when submitted to his people. We do not know what sum will be asked of Lewis county, nor the terms of the proposition to be submitted to her people, but suppose she will be asked for one hundred thousand dollars, one-half to be paid in twenty year seven per cent. bonds, when the road is finished to Vanclevurg, and the balance in bonds when the road is finished to the eastern boundary of the county. This proposition will be liberal, and secure to the people of Lewis a railroad which will be invaluable to them before any bonds are issued, at a cost per mile about equal to the cost of their turnpike roads. If submitted in this way they ought to vote it, and we predict they will vote it by a large majority.

The taxable values in Lewis county amount to nearly two million five hundred thousand dollars. To meet the interest on one hundred thousand dollars, only thirty cents on the hundred dollars is required. That is, the man whose property is assessed at one hundred dollars will pay an annual tax of thirty cents; one whose property is assessed at one thousand dollars will pay three dollars annually, and the fortunate owner of ten thousand dollars worth of property will pay but thirty dollars per year—much less than the cost of the to-

bacco or spiritous liquors consumed by many economical and temperate men. This road runs a distance of forty miles through the county of Lewis, and will cost, if the people subscribe one hundred thousand dollars, but twenty-five hundred dollars per mile for that entire distance,—the cost of an ordinary turnpike road,—and in building the road through the county the enormous sum of one million of dollars must necessarily be expended.

When the people of Lewis build a turnpike they put up their money *before* the road is commenced, and get nothing but the road when their money is expended. In this case they get a railroad which costs twenty-five thousand dollars per mile, finished in running order before they pay a dollar of their money.

Moreover, when this road is finished, it is subject to taxation, and will be assessed for taxation for all local purposes for all time to come. That part of the road within the county of Lewis will cost, and will be assessed, at one million dollars. The building of this road will bring other values into the county, worth half as much more. The road and these values will certainly add to the assessments of the county one and one-half millions of money which will be assessed to pay the debts outstanding at this time against the county, and will pay one-third of that debt, one-third of the debt of one hundred thousand dollars created by the subscription to build the road, and one-third of all debts to be contracted in future to build turnpike roads and other improvements. This being the case, it is plain what is lost in taxes one way is gained in another by the present taxpayer of the county.

As we have said, there will be expended in the construction of the road in the county of Lewis one million of money, and after it is completed, to keep it in repair, and in various ways, from fifty thousand to one hundred thousand dollars annually for all time to come. Lewis can furnish of her surplus timber, which is now without a market, all that the company will need to build the road and keep it in repair for years to come. The profits on this timber will be more than one hundred thousand dollars. The expenditure of this vast sum of money required to construct the road through the county will more than compensate each individual for the tax paid by him. Taking any view of the case, nothing can be lost, while much is gained to the people of this little county if they vote the proposition.

One Month Longer.—Owing to the bright prospect of the building of the Kentucky & Great Eastern Railway, we will continue taking sheriff's receipts for railroad taxes paid in Mason and Nicholas counties *at par* in payment for new subscriptions to the *Republican*. Write your name across the back of the receipts and send them along at once if you would avail yourself of this opportunity.

Hit Him Again.—We know of a farmer—he lives near this city, and nearly everybody knows him—who brought a drove of hogs into Maysville on Monday, had them weighed and took them to the river for shipment to Cincinnati. The boat couldn't take them, and Mr. B drove his hogs back home. On Tuesday he brought them down again, and met with no better success. He had the exquisite pleasure of driving them home a second time, and the Lord only knows when he can get them off to market. Mr. B. was a violent anti railroad man. We are sorry for him, but hope our road will soon be built, and then he won't have any more trouble. Railroad travel is not affected by low water.

How other parts of the State regard our Enterprise.

The Lexington *Observer & Reporter* and the Frankfort *Commonwealth* on Friday and Saturday last, had excellent articles on the subject of the Kentucky & Great Eastern Railway, and the vote which the people of Mason county were about to take in favor of a subscription of stock to the road. We wish we had room to transfer both articles, long as they are, to our columns. The *Observer & Reporter* recites with great truth the struggles which the people of Mason have endured to secure a road, and compliments them highly upon the courage and fidelity to their true interests which they have shown in pushing forward the Maysville & Lexington road. It regards the enterprise in which they are now engaged, as one not only of immense future value to them, but to the interests of the whole State of Kentucky, and wishes our people success in the election. That paper ere this has heard with what unanimity our people have voted the subscription of \$400,000 to the capital stock of the Kentucky & Great Eastern company, and in its liberal and enlightened views of the value of that enterprise will rejoice with us over the result.

The Frankfort *Commonwealth* takes pretty much the same view as the *Observer & Reporter*, but avails itself of the occasion to urge upon the people of that section to make practical use of the advantages which the Kentucky & Great Eastern will afford them, and make the link between Frankfort and Paris necessary to give them a connection with Maysville and a short route east. This is the conclusion of the *Commonwealth's* article:

"If this enterprise shall go so far in the way to success as to be let to contract, there can be no doubt but the Frankfort & Paris Railway, completing the link from Frankfort to Maysville will be constructed. The very fact of this possible connection should induce every effort to complete the Frankfort & Maysville line. Scott county has voted \$300,000 for the purpose, and Bourbon will do the same as soon as its present board of foggy magistrates can be got out of the way so as to submit the vote on the project. Franklin county should not be backward in doing its part in helping along this connection. It will add vastly to our trade and give us a short route to the east. Then we shall begin to be what we ought now to be, a brisk, populous and prosperous section of the State.

Kansas City, St. Joseph and Council Bluffs Railroads.

REPORT FOR THE YEAR ENDING MARCH 31, 1871.—CONSOLIDATIONS.—This railroad was originally the property of several distinct corporations, as follows: The

Missouri Valley Railroad Company, from St. Joseph to Atchison, which railroad was mainly built by aid from the State of Missouri, and was by degrees extended to Kansas City, when it was consolidated with this company; the

Council Bluffs and St. Joseph Railroad Company, which built the railroad from Council Bluffs to the southern line of Iowa, and the

St. Joseph and Council Bluffs Railroad Company, which built the link from St. Joseph to connect with the last named railroad on the north and with the Valley Railroad on the south. In 1868 the two companies owning the line between St. Joseph and Council Bluffs were consolidated under the name of St. Joseph and Council Bluffs Railroad Company, and in 1870 this company was again consolidated with the

Missouri Valley Railroad Company, and then took the name it now bears.

ROUTE AND RESOURCES.

The main line extends from Kansas City, Mo., to Council Bluffs, Iowa—205 miles—with a branch from St. Joseph northeasterly to the Missouri State line, 60 miles, making 265 miles of road.

The main line is all the way upon the bottom land of the Missouri, with scarcely any grade at any point, the maximum being about 15 feet. These bottom lands are mainly on the east side, averaging from seven to nine miles in width. The road runs nearly through the middle of them.

The business of the main line of the Burlington and Missouri Railroad runs over this road from Council Bluffs, about sixteen miles, and the branch strikes this road at Hamburg, about fifty miles from Council Bluffs, and runs up to Nebraska City, about nine miles. The business of both Hamburg and Nebraska City the most important points between St. Joseph and Council Bluffs, has, therefore, to a large extent, been lost to this company, while rates have been considerably affected by competition.

Notwithstanding these and the rapid progress of improvements by other railways, materially affecting the revenues, which it was reasonable to expect that this road would command, its earnings have been enough to pay the interest on all its securities, and it is believed will in the future continue to increase.

RESOURCES AND EARNINGS.

The earnings were from August, 1868, to March 31, 1870:

From passengers	\$581,073 35
" freight	449,682 21
" miscellaneous	51,154 52

Total

Operat'g expenses. \$611 342 59	\$1,081,910 08
Taxes..... 21,661 21	
Boston Office..... 9,061 27	
Int't & Exchange.. 400,964 61	

—\$1,043,029 63

Balance to income account... \$38,880 40

The earnings for the last fiscal year, being from April 1, 1870, to April 1, 1871, were:

From passengers	\$687,178 85
" freight	505,138 54
" miscellaneous.....	76,185 76
" interest and exchange.....	3,434 62

Total.....\$1,221,937 77

Operat'g expenses. \$729,802 28

Taxes 31,531 06

Boston Office..... 8,887 21

Rents 3,640 57

—\$773,861 12

Interest on the bonded debt for

the year is..... 442,833 75

\$5,242 90

Balance to credit of income for

the year, with prior balance... 38,880 40

Balance of income..... \$44,123 30

It is not easy to compare the earnings of the last with prior years, because of the consolidation and the construction of additional road between St. Joseph and the State line.

The increase of the year over those of the prior year, on the whole line, has been \$94,691 98.

In conclusion, President Joy remarks: "It is not easy to estimate the business of the

present year. As has been stated, the improvement of the country along the line is very rapid. About one-third has been added to the lands cultivated in the counties through which the road runs during the past year, and in the bottom immediately along the road probably a much larger proportion."

FINANCES.

The bonded debt to date is\$5,776,500 00
Capital stock is 2,789,413 66

Total.....\$8,565,913 66

We condense a portion of the credit items, as follows:

Cost of construction of 260.2

miles to April 1.

1870.....\$7,504,404 23

Cost of equipment 533,602 79

—\$8,038,007 02

Amount expended this year, per Superintendent's report:

For construction..... \$575,831 72

For equipment..... 130,882 85

Total..... \$706,714 57

EQUIPMENT AND IMPROVEMENTS

The report of the Superintendent, A. L. Hopkins, Esq., shows that during the year there have been added two first class passenger coaches, two locomotives, 100 combination cars and one wrecking car. The present equipment consists of 21 locomotives, 297 passenger and freight and 83 road cars. The roadbed has been kept in a constantly improving condition, and is in much better order at present than ever before. The branch road has been completed to the Iowa State line, and will soon connect with a branch of the Burlington and Missouri Railroad from Creston, built to meet it. A new connection with the North Missouri Railroad and a connection with the Kansas City Bridge has been built, costing \$9,648 33, not including right of way, which is still unsettled. The statistics of the passenger and freight business were not kept in such form, previous to the consolidation, as to admit of a satisfactory comparison.

LAND DEPARTMENT

The lands owned by this company were principally acquired by the consolidation of the St. Jos & C B R. Co. and the C. B & St. J. R. Co., in 1869, having been donated to the latter company by the counties in Iowa, and comprised originally about 6,750 acres, known as swamp lands, also a number of town lots in Pacific City, Watson and Corning. The report of the Land Commissioner is made to April 26, 1871, including twenty-six days of the present fiscal year.

TOTAL SALES FROM APRIL 26, 1869, TO APRIL 26, 1871.

3,597 12-100 acres (average per acre \$6 10) \$21,939 06

Town lots 1,184 00

Total \$22,123 06

Principal unpaid..... 9,381 24

Total collections on sales as above 14,188 05

Collections on sales by the C. B &

St. J. R. Co., prior to Nov., 1868 1,090 86

Total receipts \$15,278 91

The amount and estimated value of unsold lands is as follows:

2,681 acres in Pottawattamie Co.,

Iowa, at \$4 50 per acre..... \$12,064 50

76½ acres, with saw mill and house

near Bartlett, Fremont Co., Ia... 2,000 00

222 town lots, aggregated..... 4,700 00

Total..... \$18,864 50

Erie Railway.**THE OWNERS OF THE ERIE ROAD APPROVING THE ACTS OF THE MANAGERS.**

The annual meeting of the stockholders of the Erie Railway Company was held yesterday in the offices at Eighth avenue and Twenty-third street. Shortly before the stockholders assembled the board of directors met and the following letter was presented:

To the Board of Directors of the Erie Railway Company:

GENTLEMEN: The many unjust and unfounded attacks which have been made upon the act commonly known as the "Classification Act," although sufficiently answered by the unanimous action of the stockholders in accepting that act, nevertheless seem to make it desirable that we should show, by some fresh action, that the law only expresses the continued wish of the stockholders of this company.

It has been charged that the object of the statute was solely to perpetuate the office and power of the undersigned. In fact, we have always been willing to submit to a vote of the stockholders, and we beg to offer a practical test of our readiness to abide by their decision, for which purpose we now lay before you our resignations as directors of this corporation, a trust which we shall not again take up unless freely restored thereto by the vote of the stockholders.

Your obedient servants,

JAY GOULD,
JAMES FISK, JR.
FREDERICK A. LANE.

NEW YORK, Oct. 10, 1871.

On motion of Mr. Eldridge, seconded by Mr. Thompson, the resignations were accepted.

The secretary was instructed by the board to submit to the stockholders the report of the investigating committee, and the proceedings had thereon, including the release executed to Messrs. Gould, Fisk, and Lane by vote of the board of directors.

The board then adjourned until afternoon.

The stockholders' meeting having been called to order, Mr. Henry W. Rathbone was elected chairman, and Mr. Simons, secretary.

Mr. Otis presented the report of the board of directors; and all the proceedings of the board during the past year were ratified by the stockholders by unanimous vote. Mr. Swan, the agent of Heath and Raphael, and the other adverse English stockholders, and who holds their proxies, was present during the stockholders' meeting, and was there almost the whole time of the election.

The vote on ratifying the action of the committee was taken *via voce*. A call for the "nays" failed to elicit any response from Mr. Swan.

Some German stockholders were also present. One of them expressed his hopes that the administration would succeed in declaring a dividend for the present year. The German gentleman took things pleasantly and hopefully, and went away in good humor.

Resolutions applauding the existing administration were passed by unanimous vote.

The polls were kept open from 11 until 2. Messrs. Jay Gould, James Fisk, Jr., and Fred. A. Lane were elected directors for the full term of five years by unanimous vote. Votes were cast upon stock to the amount of over \$33,365,000.

The time of Directors Judge Hilton, Geo. C. Hall, and M. R. Simons having expired,

they were re-elected for the term of three years.

At the afternoon session of the directors, Messrs. Gould and Fisk were re-elected president and vice president, respectively, and Messrs. Gould, Fisk, Lane, Archer, and Ramsdell were continued the executive committee. —*N. Y. Sun*, Oct. 11.

National Commercial Convention.

REPORT OF THE COMMITTEE ON RAILROADS—Mr. Stannard, of Missouri, presented the following:

To the President of the National Commercial Convention:

Your committee, to whom was entrusted the general subject of railroads, and the consideration of propositions and resolutions referring thereto which might be offered in Convention, have given such deliberation and discussion to the various subjects presented as has been possible under the circumstances, and beg leave to submit their report.

In regard to the subject of narrow gauge railroads your committee recognize the topic as one of commanding importance, and which has largely occupied the attention of railroad men within the past few years, and which must continue to be a subject of great and increasing interest.

Earnest views both in favor of narrow gauges and opposed to them were advanced in the committee, and sustained with great force, but the committee, from the very great practical importance of the matter, are yet reluctant to express a decided opinion for or against a system whose merits or demerits do not as yet seem to be ascertained by the only infallible test of practical use.

The topic was submitted to a sub-committee, whose report upon that subject was received and is herein accepted as the report of the committee as follows—(printed below)—and in addition to this report the committee desire to express a decided conviction, that whatever gauge may eventually be determined to be the most desirable, a uniformity of gauge would be eminently conducive to the convenience and accommodation of the whole business of the country; as much consideration as was practicable was given to the existing disproportion between local and through freights exhibited in the freight and passenger tariffs of the various railroad companies, and your committee are of the opinion that a very divided diminution of the disproportion between local and through freights would be affected without injury to the interests of railroads, while it would greatly promote the general convenience and would especially conduce to the satisfaction of residents along the line of the different roads, and promote the general sympathy of real residents, which is an object worthy of the attention of the managers of all public enterprises.

And the passage of the resolution referred to this committee, and submitted with this report, is recommended.

The attention of your committee is called to the difficulties sometimes experienced by railroad corporations in obtaining satisfactory charters for railroads extending through different States.

And your committee, while fully appreciating as well the importance of the subject as the delicacy of expressing an opinion by which any impunity could be tortured into a disposition to interfere in the slightest degree with State or sectional matters as such, still desire to do all in their power to draw the attention of this National Convention to the

great relief and the increased facilities that would be given to railroad enterprises throughout the United States by an increase of its liberal and catholic spirit of comity and courtesy already existing between our various States.

The committee also feel in duty bound to express a decided preference for air line railroads, whenever, wherever and between whatever termination they may be constructed. They accordingly recommend the adoption of a resolution upon these topics which accompanies this report.

Your committee are also of the opinion that a Southern transcontinental railroad from ocean to ocean is entirely feasible and under as favorable conditions and with as fair a promise of success as has attended the construction of the Northern or Central Pacific Railroad; and believing that a Southern Pacific Railroad is necessary to the full and round completion of a national railroad system, and believing that the endowment of such an enterprise by this National Convention will be cordially given and received, and largely tend to the promotion of a warm and cordial spirit of common nationality, they recommend the adoption of a resolution prepared upon that subject, and submitted with this report.

Having thus disposed of all matters submitted either by general recommendations, the report, or by special resolution, this report is respectfully submitted:

1. *Resolved*, That this Convention recommend to railroad transportation companies to so reduce local rates of freight and passage as to give them a nearer proportion to through rates.

2. *Resolved*, That a liberal commercial spirit should prevail between the different States in granting reciprocal rights of way across their territory to all railroads, and that an air line railroad from Cincinnati to Chattanooga would conduce to the general welfare, and especially to that of the South. This Convention disclaimed any purpose to indicate the authority under which said air-line road should be constructed.

3. *Resolved*, That this Convention is fully persuaded of the feasibility and desirability of a railroad chain extending from the Atlantic to the Pacific, and laying entirely to the South of the Central Pacific, and will most heartily hail its completion as a practicable and necessary portion of a truly national railroad system.

The report of the sub-committee on narrow gauge railroads, referred to above, was presented by Mr. Guthrie, as follows:

The sub-committee to whom was referred the subject of narrow gauge railroads, report:

This class of railroads has but recently been brought to the notice of railroad men, and of the people at large in this country, and so far no line of road of three feet or less gauge has been fully constructed from which we are able to get substantial facts upon which to base opinions as to their actual or comparative value.

In this, as in all new subjects promising great advantages at decreased cost, wild speculations are likely to arise, and enterprises to be put on foot in which the investors are to be disappointed. Enough, however, is known from the reports supposed and believed to be reliable of narrow gauge roads in Wales, Switzerland and other countries, to justify your committee in stating that the diminished cost of construction of three feet gauge roads, being estimated at from one-half to two-thirds of the cost of the usual gauge roads, the increased facility overcoming heavy grades and

accompanying sharper curves, the greater diminished cost of operation, point to such a class of roads as offering at least to many sections of our country great inducements for constructions, and while they may not become, or may not be suitable for long lines of roads, or the transportation of all kinds and classes of freight, yet the commerce of local traffic and the bringing into railroad connection sections of our country where the physical geography of the same would make the construction of wide gauge roads impracticable, either from the great cost or sparseness of population, they must become valuable and mark a new era in the rapid progress of railroad developments of this nature.

The reports of such roads as your committee have seen, all give results in construction as about \$12,000 per mile, including equipment, the cost of operating at one-third less than a wide gauge, and rate of speed in travel equal to other roads. In this country several roads are now being built, while many are projected, and likely to be undertaken at no distant period. A road of this class is under construction from Denver City to El Paso; one from Leavenworth to Denver, on the Pacific Railroad; one from St. Louis to Cairo, besides several others of less distance and minor importance. The Committee therefore recommend, in view of the great importance of this subject, and the lack of reliable information, the appointment by this convention of a special committee of five, to report at the next convention.

The Overflow of the Mississippi River.

The recent New Orleans flood is another reminder of the neglected laws that govern the action of water over beds and between banks of yielding material. Like all other calamities, it is calculated to draw our attention to precautionary measures against the recurrence of other similar disasters.

It would seem to be too plain to require repetition that the temporary effect of the levee system, for promoting the overflow of the Mississippi banks, is worse than useless. The rise of the bed of the river is as sure to follow every freshet, which is confined within its banks, as it is that the freshets bring down sediment that is not disposed of by crevasses, rendering the section of the stream less than the capacity required by the next freshet, consequently increased height and strength of levee every year.

It may not be clear to every person how the sediment should be deposited more by freshets than by a less flow of water, on the same bed. But there is more sediment in a freshet than in low water, which is deposited more readily in proportion to the difference between the inclination of the surface of the water in a freshet, and in low water, with regard to the inclination of the river bed, which is the same in both cases. The rise in the water being greater above than at the mouth, to give the necessary velocity to dispose of the surplus water of a freshet, confined within limited banks, increases the inclination of the surface, while the bed remains the same; it also increases the section of the stream more above than below. This, together with the action of gravity on the water with increased motion and inclination of surface, and consequent greater reaction on the bed, has the effect to diminish the motion of water nearer the bed of the stream, and throw down more sediment than will be deposited when the bed of the stream is nearer parallel with the surface.

Whatever difference of opinion may exist about the theory, the fact has been established by experiment that the motion of water near the bed of streams is less in freshets than in low water. Common observation also teaches us that the beds of the lower waters of all similar streams to the Mississippi, where the freshets are confined within the limits of their low water banks, are annually rising. With these facts in full view, it seems easy to comprehend the necessity of adopting some other means of avoiding all similar catastrophes by looking towards the source of the evil instead of confining our gaze on the evil itself. By such a deviation from the too common course, we shall soon see that freshets may be arrested near where they originate, much easier than they can be confined, alter a combination of a large number of tributaries have collected their forces and concentrated them on a main outlet like the lower Mississippi.

By the selection of proper sites for reservoirs at or near the head waters of rivers, it is very easy to see that much less expense of dams will prevent a freshet than will prevent an overflow of the lower river banks by levees.

The argument against reservoirs is the danger of breaking away, of which there is no necessity whatever, if properly planned and constructed. If the reservoirs be numerous, as they must needs be on the Mississippi, it would not be at all probable, in any event, that all would break at the same time, or enough to do any harm; whereas, the dykes, being necessarily more extensive, are proportionally more liable to break in some part of the two long lines, always doing more or less damage, according to the extent of the freshet and the location of the breach, without the possibility, sometimes, of repairing the crevasse until the freshet subsides; while a reservoir dam may be immediately repaired, ready to check the torrent in case of any other similar accident.

Many of the reservoirs may be so located as to be worth more than their cost for the water power they would provide, but the greatest advantage to be derived from them on the Mississippi river would be the benefit to navigation, by affording more water in a low time, and preventing the accumulation at the mouth, which is now the effect of every freshet.

It is now well known that the bar at the mouth of the Mississippi is the worst at the time of the highest freshets, affording the least depth of water for the entrance of ships. But the low season allows the salt water to flood the bar, and float up the new deposit made on the clean washed low water bed, in the shape of what is called "mud lumps," from the greater weight of the salt water to that of the newly deposited sediment, assisted, perhaps, by fermentation of vegetable matter contained in the sediment, during the hot season, subsequent to the freshet; after which there is a greater depth of water over the bar, until another freshet has forced the heavy salt water from the location, when another bar is formed as before.

This consideration alone should be sufficient to induce any Government, with competent foresight, to institute an inquiry, at least, calculated to solve the mystery of the right plan for overcoming the evil attending the uncontrolled freshets of the Mississippi river, which would also provide a specific for the freshets on all similar streams as well.

No investment of public lands or public money could be made that would afford the same returns as the permanent improvement of the Mississippi and its tributaries by the reservoir system. This plan has the uncommon merit of being progressive.

When the reservoir is properly constructed, it is a permanent improvement as far as it goes, whether the system be extended or a return to any other system be adopted, it works equally well; therefore, if the estimates of the engineer in charge be not satisfactory, an experiment may be made without a total loss, as with most experiments. The amount of water withheld from a freshet by a reservoir reduces a freshet and its effects, and the additional levees required, in exact proportion to the capacity of the reservoir, for all time to come, whether any more be constructed or not; and if the reservoir system be carried out to its fullest extent on any river like the Mississippi, so as to equalize the flow of water at all times, the stream will soon acquire a fixed regimen; every yielding obstruction to the full capacity of the stream will soon have given way to the continued action of the water, affording an uninterrupted navigation, with a permanent location of the stream, which can be obtained in no other way.

The following are some considerations in favor of the reservoir system in contrast with the levee system:

Reservoirs require no additions or repairs from year to year, if properly constructed.

Levees require additions every year in proportion to the amount of deposit on the bed of the river left by the preceding freshet.

Reservoirs retain the sediment of the freshet in proportion to the amount of water retained, and lessen the accumulation in proportion to the diminished height and velocity of the surface current.

Levees increase the amount of sediment in proportion to the increase of height and velocity of the surface current by the freshet.

Reservoirs create a fixed regimen and location for a stream, when the system is fully carried out, which frees the banks above the surface of the water from abrasion by currents, while the lower banks and bed of the stream are soon washed clean of their yielding particles, producing a uniform pure, clear water stream in all seasons of the year, affording the least amount of material for the bar at the mouth.

Levees, when the most successful, cause the highest freshets and the greatest amount of abrasion of the banks, consequently the most variation in the course of the stream, affording the largest amount of material for the bar at the mouth.

Reservoirs, by promoting the overflow of large surfaces of land in warm climates, lessen the amount of fresh material for miasm, so abundantly supplied by freshets, and so prejudicial to health.

Levees, if permanent, must necessarily expose a large amount of saturated surface, covered with sediment, between the levees, after every freshet, to the action of the sun; but, if not permanent, the disaster to health as well as property is very great.—*D. S. Howard, in Jour. Frank. Inst.*

—The East Tennessee, Georgia, and Virginia Railroad Company has purchased the Cincinnati, Cumberland Gap, and Charleston Railroad for the sum of \$300,000 in Tennessee State bonds. The Knoxville and Kentucky Railroad has been sold for \$350,000 in State bonds, to a company composed principally of northern capitalists; among them are Thomas Scott, of the Pennsylvania Central Railroad; Simon and Don Cameron, of Pennsylvania; Columbus Delano, of Ohio; Moses Taylor, of New York; D. B. Sevre, of Boston; A. L. Maxwell, of Macon, Georgia; Jos. E. Brown, of Atlanta, Georgia, and others.

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The Railroad Record.

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The Railroads of Western Virginia.

CHESAPEAKE & OHIO—GREAT EASTERN.

Till recently, Western Virginia has been literally a *terra incognita*, an unknown land. The war brought it out considerably, by bringing it within the knowledge of civilized people. Before that, however, the Baltimore & Ohio Railroad had carried its work on to Wheeling, and then made a branch from Grafton to Parkersburg, on the Ohio, and continued thence to Cincinnati by the Marietta Railroad. Recently, this company have been constructing an entrance into Cincinnati, called the Baltimore & Cincinnati Railroad. This will complete the great Baltimore & Ohio Railroad from the Potomac to Cincinnati, and in regard to tidewater the shortest distance between the Atlantic and the Ohio. This great road, however, only passes through West Virginia on its eastern side, and has only made known the resources of that State in a small section. The next railroad which undertook to penetrate Western Virginia was the Chesapeake & Ohio. Of this we have written at length in former articles, showing its great importance to Cincinnati, and the certainty of its early completion. Since then it has been advancing with great rapidity, and the grading down the Kanawha valley is completed. The road is an extension, and as we may say a fulfillment, of the old Virginia Central. When completed, it will be the shortest line between the Ohio

river and the magnificent harbors in Chesapeake bay. This road was completed to Covington two or three years since, and recently to White Sulphur Springs. The only serious delay will be in the completion of the great tunnel through the Allegheny mountains near the sources of James river. This side of that, as we have remarked, in the valley of the Kanawha, the grading is completed. It will be seen by consulting a map, that this road penetrates the very heart of Western Virginia, as the Pennsylvania road does Pennsylvania, and it is very similar in character and construction. It is similar also in another and most important particular. This is in passing through an immense district of coal and iron. Time may be necessary to develop this region as it has done that of Pennsylvania, but it certainly will be brought out, and in the end make another great manufacturing country. As this work is one of the greatest going on in the Ohio valley, and one of great interest to both Ohio and Kentucky, we avail ourselves of information given in some very interesting articles written for the New York *Tribune* by Charles Nordhoff, Esq., who lately journeyed through Western Virginia. He passed through Portsmouth to Ironton, in Ohio; thence to Huntington, the new town at the terminus of the Chesapeake & Ohio on the Ohio river, and thence up the valley of the Kanawha. He describes the immense beds of coal and iron, of the finest quality, in that section of Virginia, deposits which have long been known to people in this region. He thinks, and so do we, that Huntington may become an immense coal depot, which will supply and regulate the market of Cincinnati.

The Guyandotte is crossed also by a railroad bridge, over which the cars ran for the first time to-day, and the whole line between Huntington and Colesmouth, and indeed to the mouth of the New river, at the falls of the Kanawha, is graded, the ties are laid, or ready to be laid, and the road is ready for the iron, which has been delayed by low water on the Ohio. It came up to Colesmouth this morning, and a force is ready here strong enough to lay three miles a day on the line of 103 miles which is ready for the iron.

From this it appears that we shall soon have a railroad in the Kanawha valley, making the commercial intercourse at all seasons of the year to a point of shipment to Cincinnati. It is obvious that this is to be an immense advantage to Cincinnati, for the whole trade of West Virginia and Eastern Kentucky belongs to Cincinnati, and can go nowhere else.

Mr. Nordhoff makes the following curious statement:

There are about 5,000 men now at work on the unfinished line between Huntington and the White Sulphur Springs. The greater part of these are colored men; and so far as I have had opportunity for inquiry, they are counted first-class laborers. They come mostly across the mountains, from Eastern Virginia; many of them from the tidewater region; they do not drink; they work as well

in the tunnels and on the rougher parts of the line as the best class of Irish railway laborers; they do not give trouble, are quiet, and do not shirk work.

We should say this is a decided triumph over the Anglo-Saxon and the Celt. At any rate we are glad there is this available force for the making of the great works which Virginia needs.

The Chesapeake & Ohio will have a branch through New river to a point on the Virginia & Tennessee road. This road via New river passes through one of the wonders of the world. Mr. Nordhoff considers it far beyond Yo Semite valley, and it probably is. He says:

I do not know why it is called the *New* river, though I am ready to admit that it was a novelty to me. It rises in North Carolina, and flows northward and westward until it falls into the Kanawha, about two miles above the great falls. Its water is too warm to drink; its current is fierce and treacherous; its course is full of rapids, so that navigation is impossible, and even lumber rafts can not be floated on it safely; its banks are steep, and in many parts precipitous, and from 800 to 1,200 feet high. It has, for at least 50 miles above the Kanawha, absolutely no bottom lands or flat shore; and when the engineers were making surveys for the line of the Chesapeake & Ohio Railroad, they had to take their measurements and levels, suspended by ropes, and transported their provisions and tools on the backs of men from point to point. Since the building of the railroad was begun several men have been drowned in the river; and lately all the boats on the lower part have been destroyed by the contractors who at first used them, because they found their use too dangerous to life.

Such, in brief, is the New river, and by this time next year you may ride comfortably along the side of its bluffs, at the rate of 30 miles an hour, and laugh at the slow and tiresome progress of which I mean to give you a few incidents. But tiresome though our ride necessarily was, it was not tedious, for grander scenery than the New river affords, in the part of its course below the Greenbrier, it would be difficult to find in the United States, and certainly there is nothing to compare with it this side of the Rocky mountains.

We know very little of our own country; we have only skimmed along its surface, and cultivated a little here and there in the valleys. Those great railroads now making over the mountains and the continent will show us scenes and grandeur and resources which Europe never dreamed of.

The description given by Mr. Nordhoff of the construction of the Chesapeake & Ohio road is very interesting. We can not forbear making the following extract, which shows what stupendous difficulties are being overcome, and how rapidly the work progresses:

The result is a roadway which passes through the mountains on an easier grade by far than any other of the great East and West lines connecting the Atlantic and the West. The Erie Railway has grades as high as 84 feet to the mile; the Pennsylvania has 95 feet to the mile; the New York Central, though in general it has easy grades, runs up to 95 feet to

the mile; the Baltimore & Ohio runs up to 114 feet to the mile. The Chesapeake & Ohio will have no grades over 30 feet to the mile facing west, and west of Howard's creek it has none over 20 feet to the mile. It will have the lowest grades of all the great East and West lines, and this, joined to the fact that it taps the Ohio at a point, Huntington, so low down that it is always accessible to steamboats, and that it will give the South west its shortest connection with the Atlantic, would make it a great enterprise, important to the country, even if it did not pass through a region of unexampled richness in coal, iron and timber, which has heretofore been shut out from a market, and closed against capital and industry.

The New river and the Greenbrier have, in the course of ages, worn their way through the mass of hills and mountains which lie between the falls of Kanawha and the White Sulphur Springs. In all this country, so far as I could notice, there are very few signs of the upheaval strata. The rocks lie in their beds as they were deposited, and the river seems to have worn its way down from the tops of the mountains to its present level. It was to carry an easy grade that the engineers of the Chesapeake & Ohio road selected the course of the New river for their line. There, Nature had done, in the course, perhaps, of millions of years, a work of excavation for them, which gave them the means of laying a road bed so nearly level that it presents no obstacles to travel or transportation. They had only to take care that the road should run above the level of high water; and as the river rises sometimes 40 or 50 feet, this has placed the line high above the low water which prevails at this season of the year. At two great bends which the New river makes, tunnels are building. One of these, 6,400 feet long, will be the longest in the United States until the Hoosac tunnel is completed. It saves nearly five miles of difficult road building. In these tunnels large gangs of men are employed at several points; and the whole line is in a good state of forwardness. With the exception of some miles of easy work near the Greenbrier, which can be done so rapidly that it was not advisable to put it under contract till next spring, the whole line of the New river and Greenbrier is under contract, and everywhere the contractors' gangs are busily at work. A great part of the road bed has already been completed, and all is so planned and carried on that the whole line shall be done simultaneously with the tunnel at Great Bend. There is no reason to doubt that, as the work is now going on, the road can be opened by or before next October, which I believe the engineers expect to accomplish.

The next great work proposed by Western Virginia is the Kentucky & Great Eastern. Substantially this work will pass transversely to the Chesapeake & Ohio, but it aims, like that, to reach the Atlantic, but at New York. On the Kentucky side, it will substantially be a railroad from Cincinnati to the mouth of the Big Sandy. This it is, in all aspects; but, as we have stated before, the object of the company is to make a short line to New York through a country as yet unoccupied. This line will be from Cincinnati, crossing the railroad bridge, to the mouth of Big Sandy, thence through Western Virginia, parallel with the Greenbrier mountains to North-eastern Virginia, thence through Eastern Pennsylvania to New York.

The surveys heretofore made show that this road will be nearly 100 miles shorter than the present Pennsylvania road. This being a fact, the conclusion is inevitable, that in regard to the Ohio valley it will have the great bulk of the passenger traffic.

What seemed to us strange, looking to the mountainous region of Western Virginia, is, that the surveys show very low grades. But we see that the same is true of the Chesapeake & Ohio road. In that case, however, it is accomplished by taking the valleys. In the case of the Great Eastern, it is by not crossing the mountains, but running parallel with them.

Should these great enterprises all be accomplished, Western Virginia will have 1,000 miles of railroad which in point of interest and value will be unsurpassed in interest by any works in the country.

Coal Famine.

THE REMEDY

The condition of the Ohio river, at the present time, fully demonstrates its unreliability for practical daily commerce; although with the first flood we will all forget its shortcomings, and praise its capacity and value above measure, until the next season of either frost or drouth, when every tongue will again be loud, as at present, in condemning it. Every body to-day will concur with John Randolph, and swear that he was right, or at least not very far from it when he declared that the Ohio river was of no account, "that it was dry six months in the year, and froze up the rest."

Various are the remedies proposed. The *Pittsburg Gazette* has a lengthy article on the subject, and suggests a very good thing, but then it will never be done; that is, to make the Ohio navigable all the year round. It suggests two or three methods of getting at it. It thinks the General Government ought to do it; but then, it won't. The States bordering on the Ohio are deeply interested in its improvement either as producers or consumers of coal, the *Gazette* thinks they ought to move in reference to its permanent improvement, but they likewise shirk the responsibility, and throw the onus on Uncle Sam. Under these embarrassing circumstances, the *Gazette* thus appeals, but we think, vainly, to individual effort:

"It would be an easy matter, one would think, where there is so much actual wealth, to raise a few million dollars for the purpose of inaugurating an enterprise of such direct advantage to the trade of our city, and that of the other important places bordering on the Ohio. And yet so far it is impossible. Ask a business man to subscribe, whose coal barges and steam tugs lie rotting in the sun for want of sufficient water to float them, and he will most likely reply, 'the government should improve the Ohio, not the people who use it.' Ask the State government to appropriate a

sum for improving this river, and you will receive for answer, Ohio and Kentucky, Indiana and Illinois will do nothing; they are more interested than we. Ask the general government to help us, and will tell us 'help yourselves.' So the matter rests, and it will continue to do so, until private enterprise shall be sufficiently energetic to lay hold, and at least begin the work. Shall it not be done? Who will make the first move in the matter? The man who starts out in this good work, and succeeds in accomplishing it, will carve for himself a name among the illustrious of our day. Is Pittsburg energy not equal to the task of successfully improving the Ohio river? If so, our people have been over-estimated, and our wonderful utilitarianism and indomitable pluck are but the transient dreams of the flattering tongue.

"Pittsburgers, we call upon you to make the trial at once. Let a meeting of our citizens be called, ask the people of the cities and towns along the Ohio to do the same, and ascertain if a sufficient sum can be obtained to at least do some good."

We find in the *Chronicle & Times*, a communication from CLERMONT, who suggests the construction of a railroad on the river bank on the Ohio side, to connect with the Chesapeake & Ohio Railroad, as a necessary work of benevolence or charity, and places it on the same footing with aid to the sufferers by the great Chicago calamity. The truth is this will not be done either, because it is next to impracticable on account of the great cost of crossing the bottoms of the Scioto and Little Miami rivers. The middle, or even the Hillsboro route, would be cheaper and therefore preferable, with grades very little heavier, for both claim to get through with but 26 feet grade. None of these routes will be completed without the aid of the Chesapeake & Ohio Railroad, and we are disposed to think they will favor the Hillsboro line, as they can readily branch off and form a North-west connection via Dayton.

But listen to how pathetic CLERMONT is, in his appeals to Cincinnati charity, to increase the value of Clermont lands and make suburban residences (a la Westchester county) in the neighborhood of his farm:

"From Huntington to Cincinnati is only 197 7-10 miles, with a grade of 15 feet to the mile. With such an easy grade, and no sand bars or icebergs to contend with, the coal will be poured into the State in such quantities that a famine would be impossible. Will Cincinnati awake to her interests only when it is too late? Should the road come down the Kentucky side Cincinnati would be the loser, as whatever improves a State improves a city of that State; or should the road be made to Hillsboro it will there connect with Dayton and the West, leaving the Queen City in the lurch. Aside from the coal question, if we get the railroad the whole valley along the Ohio side would be dotted with gardens and county seats, forming still more extended and beautiful suburbs to our already flourishing city.

"While Cincinnati is being so liberal to the poor of Chicago, let her not forget her own shivering citizens, but provide for them in the most effectual manner by urging this O. & C. connection down the valley."

Now coal can be reached without going to Huntington 197 miles to get it. Coal on the Marietta road can be had in Vinton and Athens counties, distance 125 to 150 miles. Coal can be had from Indiana with about the same extent of haulage. This is all very well if we can't do better. Coal will be reached by the projected road on the Kentucky side of the river in one hundred miles, and we have great doubt if the "famishing poor" or "shivering citizens" will ask over which road it was brought, if they can only get the coal. Besides, the road on the south or Kentucky side of the Ohio will also bring ore as well as coal to our market, furnishing labor as well as fuel. Dr. David Dale Owen in his report, vol. 4, page 466, Kentucky Geology, says: "Greenup county deserves the first place in the whole State of Kentucky for its mineral wealth. It has, in abundance, beds of iron ore of excellent quality, thick veins of fat cannel coal."

Now this road is going to be built. The counties along the line are subscribing liberally toward the stock; we don't know whether Cincinnati will be asked as individuals (corporately she can not) to subscribe or not, but we suppose they will not be slighted; but the road is to be made, the evil of inability to navigate the Ohio river is to be remedied (measurably, of course, only) and the possibility of coal famines in the future obviated, and Cincinnati will not suffer very materially on account of the side of the river on which the road is built. By the Kentucky & Great Eastern Railway, coal can be readily delivered in Cincinnati at regular transportation rates at ten cents per bushel.

For our part we don't object to railroads centering here, no matter which side of the river they run on, or from whence they come, so long as they bring us traffic, and supply us with the necessities of life, and furnish the raw material for our manufactures.

The Babcock Fire Extinguisher.

[From the Boston Journal, July 7, 1871.]

DESTRUCTIVE FIRE IN PORTLAND ST.—An alarm from box 5, at twenty minutes past six o'clock last evening, summoned the Fire Department to Portland street near Causeway. * * * The roof of the brick school house occupied by the Sisters of Notre Dame, on Lancaster street, caught from the flying cinders, and the woodwork around the windows was soon burning fiercely. The Babcock Extinguisher Brigade, which was early on the ground, took possession of the building and saved it from destruction. * * * The stained glass windows in the rear of the chapel were totally destroyed, and also those of the school room and upper story. The damage estimated at about \$1,000, was fully covered by insurance in the Franklin office in this city.

The Kentucky & Great Eastern Stock Canvass.

The canvass for the subscription of the counties of Lewis, Greenup and Boyd, in the State of Kentucky, to the capital stock of the above named corporation is assuming an interesting condition. The great success of the company in the county of Mason has already affected these upper counties to such an extent that they seem more than half ready to render the aid solicited at their hands in order to secure the benefits this grand project is sure to bring them. That they will be wise in so doing there can be no doubt, as the contemplated road is one of the very best yet projected in the country, and will return to the people living within its influence the largest profits that flow from such enterprises.

To obtain roads of much less importance than this one, other communities have willingly contributed much greater aid than is required from the counties we have named, and found their profit in the investment; for such a road as this proposes to become, they would have doubled their efforts, and would now if the opportunity was offered them. Any railroad is a benefit to the country through which it passes, but when it is a great line leading to the most important points in the whole country, and possessing the advantages this one does over other similar works, in distance, grades, location, and the command of a large and remunerative traffic, its value to the country rises to proportions that to the inexperienced may seem improbable, but which the growth of the railway interests of the world attest.

The good people of these counties can't very well afford to forego this splendid opportunity to place themselves upon so important a thoroughfare. They can't afford to slumber upon the vast industrial resources that lie about them in such profusion, and remain comparatively poor in the midst of millions of dollars' worth of treasures, as they must do, however, unless this great commercial avenue is made. There is no way in which they can help themselves so much as by assisting this improvement; all other developments of this section of the country are local, whereas this is general, and unites the whole into one prosperous power. It makes valuable to the highest degree every other improvement, and will move the country ahead in five years after its completion, farther than have all the efforts of the past quarter of a century.

We understand that the propositions of the company to these counties are now before the people, and undergoing discussion, and that the vote upon them is to be taken on the 2d day of December next. We shall wait anxiously for the result, and with the strongest convictions that the more the people examine the question the more intelligent they become upon the influence of railroads upon all the interests of the country, the better they will

understand the policy of the Kentucky & Great Eastern company, the stronger will be their convictions, that to encourage this enterprise is to serve their own purposes in all that pertains to their material prosperity infinitely more than it is to subserve the welfare of the company.

The Finances of the State of Arkansas.

The Arkansas (Little Rock) *Gazette*, a paper of ability and influence, has an interesting article on the finances of that State, in a late issue, from which we extract the following:

"Not a man can be found in the State who would be willing to advocate the repudiation of the debt which we justly owe. They approve the funding of it and are willing to be taxed to meet the interest; but through motives which were well understood in Arkansas at the time the bill became a law, a debt was foisted on us which we do not owe, never did owe, and could not be made to pay in any just court of the land.

"The writer gives the debt of the State—bonded, floating and contingent—at \$16,098,000, the contingent being the railroad aid bonds, amounting to \$11,400,000. We have studied this matter pretty thoroughly, and give the following in lieu of the figures above:

Funded debt.....	\$4,430,000
State railroad aid bonds (only \$3,600,000 issued).....	11,400,000
Levee bonds (about \$1,600,000 issued).....	3,000,000
Ten year bonds to supply casual deficits.....	300,000
Floating debt	268,000
Total.....	\$19,398,000

"Now, as to the assets. There are liens against all railroads to whom bonds are issued to secure the State against loss, and if the bonds are only issued as the work progresses, the State can lose nothing from that source. There may possibly come something out of the old Real Estate Bank mortgages, which will serve to decrease the funded debt, but it is exceedingly problematical. We would not count on it with any degree of certainty for any amount. And the same may be said of the levee bonds. The swamp lands are expected to liquidate this debt by the time it is due, but there is more fancy than fact in the prospect.

"The actual debt on the 1st of July, 1871—leaving off the State aid and levee bonds not yet issued—amounts in round figures to ten million dollars. The debt of the State in January, 1867, amounted to only \$3,252,401 50—an increase in three years of over six and a half million dollars—and what have we to show for it? We ask all candid men to ponder the question and answer for themselves.

"We are aware that we will be accused of writing for political effect, but such is not the case. Our only desire is, that facts may go to the people of this State, and of the North. We have no other interest whatever in these questions. It is due to history that the truth be put on record."

— Only thirty miles of the Cincinnati, Richmond & Fort Wayne Railroad remains to be completed, and that is ready for the iron. The tracklayers are working on it from each end.

A New International Railway.

THE GREAT PASSENGER ROUTE TO EUROPE.

The more we learn of the capabilities and prospects of the European & North American Railway (which has just been opened between Maine and New Brunswick, and which will be open, a year hence, for through travel from New York and all parts of the United States to Halifax), the more important does this truly international route appear. We propose, therefore, to give our readers somewhat in detail the resources and possibilities of this line, which is certainly second only to the great Western trunk routes in its value to New England, and, indeed, to the whole country. It is already evident that all the European mails, and, ultimately, two-thirds of the pleasure travel and emigration to and from Europe, must go over this new railway, and that Halifax will thus become the chief port of embarkation and the landing of these travelers and immigrants, and also a port of entry for fast and light freight, while the heavy freight brought by the ocean steamers, will go, as now, to New York, Boston, Portland, and other ports of the country. This transfer of emigration from Boston, New York, &c., to Halifax as its landing place, will not take place at once, of course, for great inducements will be offered, especially at New York, to retain the immigrants there. But the shortening of the sea voyage by two days will determine the matter in the long run, and the willingness of the steamship companies to get rid of the abuses and extortions practiced on them and the immigrants by the Tammany officials at New York will hasten the change. Boston also will lose the immigrants arriving by sea from New Brunswick and Nova Scotia, who will henceforth travel by railroad instead of steamer, and this number amounts to several thousand in a year. They will come to Massachusetts all the same, but they will come in over the Eastern and Boston & Maine roads, as some of them now do.

It will naturally require some years to complete the arrangements at Halifax to receive and dispose of the passenger travel to and from Europe over this new route, and to change the present course of travel, which, like other things in this world, is governed by habit. But it is thought that Hugh Allan, the owner of the Canadian ocean steamships, now running to Quebec in summer and Portland in winter, will almost immediately after the road is opened from St. John to Halifax, discharge his passengers and mails at Halifax; and very likely one or two new lines of ocean steamers will be put on to run between Liverpool or other European ports and Halifax. Gradually, and without much delay, too, all the New York steamers will have to touch at Halifax to land or take on board passengers and freight, as the steamers on the other side now touch at Queenstown, only more so. Indeed, the Nova Scotians, in their most blissful dreams of the commercial greatness of their capital, never imagined half so much as the completion of this new line of railroad is likely to bring to them.

But let us leave Halifax out of view for a while, and see what the new railroad, with its tributaries and connections, must inevitably do to develop the trade and industries of Maine. This State, as large as all the rest of New England, with an area of nearly 32,000 square miles, and abounding in fertile land, timber, minerals, good harbors and unlimited water power, has been almost stationary in

population for the last dozen years, and has done little to bring forward and put into activity its great resources. This very railroad of which we are now speaking, was planned and incorporated more than twenty one years ago—but the original projector of it, the late John A. Poor, of Bangor and Portland, died, last year, without seeing it completed. But now that it is finished, so far as Maine is concerned, everybody sees what Mr. Poor and Governor Andrew and other friends of the enterprise saw years ago, that it makes North eastern Maine one of the richest and most available regions of the United States. Here is the great Aroostook county, with 5,000 square miles, larger in extent than any other two counties in Maine, or the whole State of Connecticut, and occupying the whole northern and north-eastern section of the State, well watered by tributaries of the river St. John, the largest river between the St. Lawrence and the Mississippi, covered in most places with forests of pine and spruce of great value, increasing every year, but wherever cleared furnishing as good farming land as any east of the Alleghenies. Here are grown line crops of hay and potatoes, oats, and even wheat, while there is no better grazing country, during the warm season, in Vermont or New York. The geological formation, as in those States, is slate and limestone in the Aroostook valley, and the yield of all crops that can be grown, including roots and vegetables, is enormous. Potatoes turn out 200 or 300 bushels to the acre, turnips 400, carrots from 500 to 1,000, and so on. The present cost of raising potatoes is about 25 cents a bushel there, while they are sold for \$6 a ton, which in Boston and Springfield brings \$30 or \$40. It is in this county that the State has established its Swedish colony, and the opening of the new railroad will turn in this direction a considerable current of European immigration. Aroostook county, which now has almost 30,000 inhabitants, is almost the only part of Maine which increased its population from 1860 to 1870. Close beside it, to the westward, lie Piscataquis and the Upper Penobscot counties, also well wooded and with sections of good farming land, among much that is hard and rough. Two railroads now pierce this region—the new line of which we write, and the Bangor & Piscataquis, its tributary, which is now open to Foxcroft, 50 miles north-west of Bangor, and is rapidly extending 35 miles farther north to Moosehead lake. Over the main line will go large amounts of merchandise, machinery, farming implements, supplies of all kinds for the great lumber camps and for the fertile and prosperous Aroostook region, and the northern and north-western parts of the State. The way business is remarkably large and fast increasing, and has lately kept in constant use 13 locomotives, 200 freight cars, 13 passenger cars and 4 express cars between Bangor and Mattawamkeag (58 miles), while new locomotives, freight and passenger cars are being built continually to meet the needs of this great thoroughfare. The region traversed by the tributary road abounds in timber, minerals and fine farms. The slate quarries along it contain inexhaustible quantities of the best quality. Iron is also mined, and silver, lead, &c., are found, though probably not in any amount worth mining. But the iron works will be of considerable value hereafter, while the "Bangor slate" takes the lead of all the American slate. Along the European & North American road, between Lincoln, 45 miles above Bangor, and Vanceboro, on the New Brunswick border, the Massachusetts tanners at Danvers and elsewhere,

and Maine capitalists also, have constructed tanneries, which furnish employment to hundreds of men and a large amount of business to this railroad. At Lincoln are large tanneries, and at Winn, 56 miles from Bangor, is one of the largest in the United States. The growth of hemlock along the line from Winn to Vanceboro is very valuable, and unequalled in any part of Maine or New England. In the town of Kingham, 66 miles by rail from Bangor, a tannery is erecting much larger than the great one at Winn; and all along to Vanceboro tanneries are being built, now that there are such facilities for transportation. One now building will have 5,000 tons of freight per annum, as a beginning, for the South American hides first have to be brought to the tan pits from Boston and other ports, and then carried back in the form of leather to the shoemakers of Massachusetts.

Of course the completion of the new line not only stimulates manufactures and business generally, all along its track, but also gives a new impulse to other railroads building in Maine. The branch railroad up the Mattawamkeag river into Aroostook county, which was chartered a few years since, will soon be built, and will open, perhaps, a hundred miles of rich country along its winding line. Still more important is the proposed road from Sherbrooke, in Canada, to Bangor, some 300 miles long, which is to connect Montreal by an almost straight line with St. John and Halifax, and be at least 250 miles shorter than the Intercolonial route by Quebec, Rivière du Loup, and the Miramichi region which the British and Canadian governments are building at great cost. This line, from Bangor to Sherbrooke, is already chartered, and will probably be constructed within a few years—perhaps as soon as the Intercolonial road is opened. Then will come other connections from the Grand Trunk road in Northern New Hampshire to St. Albans, and from Portland through Southern New Hampshire and Southern Vermont to New York—portions of which lines are already building. The exact distances on the railroads now built or building, are as follows:

From Boston to Bangor, 243 miles.
From Bangor to New Brunswick line, 114 miles.
From Vanceboro to St. John, N. B., 94 miles.
From Boston to St. John (now open), 448 miles.
From St. John to Painsee (open), 96 miles.
From Painsee to Truro (partly built), 116 miles.
From Truro to Halifax (open), 61 miles.
From St. John to Halifax, 273 miles.
From Bangor to Halifax, 473 miles.
From Boston to Halifax, 721 miles.
From Springfield to Halifax, 820 miles.
From Montreal to Halifax (by Danville), 855 miles.
From Montreal to Halifax (by proposed line), 725 miles.

Of the 820 miles of railroad between Springfield and Halifax all is now open, except about 75 miles north-east of Truro, Nova Scotia, which will be finished for travel before October, 1872—*Springfield Repub.*, Oct. 20.

—It is now proposed to have the Mississippi river terminus of the Cairo & Fulton Railroad at Commerce, 20 miles north-west of Cairo, instead of Cairo, and to extend it thence south-west, through Morley, on the Belmont line of the Iron Mountain road, and Bloomfield to Poplar Bluff, Mo., where the Arkansas line of the Iron Mountain road will join it.

From London to India by Railway.

The following letter from a correspondent of the *Cincinnati Commercial*, will be of interest to all who take pleasure in the advancement and material progress of the world. It seems to us, however, that at least as few physical difficulties would be met with by a route through Brussels, Frankfurt, Vienna, and Bregenz to Constantinople, than by the route suggested by the distinguished engineers, and fewer political complications. It would pursue a water line most of the way, and would have to cross only the Balkan mountains in Turkey. We have no doubt, but the political difficulties will be found much greater than the physical ones. The interests of the human family demand the construction of the work nevertheless, and we would be glad to see it completed as early as the most sanguine of its friends could dream.

Not long ago an English lady walking near the ruins of an oriental city fell into conversation with an humble stone-cutter, who was at work near them. She said to him: "Why, instead of working at these little things, do you not try to do some such work as that?" pointing to the superb ruins near by. "Ah," said the workman shaking his head. "Ah, madame, those works were not built by man." "By whom, then?" "By the Genii, madame." "And why do not the genii work in the same way now?" "They are no longer here; they have gone away—far westward—and there they are at work bridging vast gulfs, tunneling mountains, building cities." The friends who told me this story had the best reason to know its truth. The picture brought before the mind, was a picture not of one poor mechanic alone, but of the whole East seated amid its ruins, and dreaming only of its departed genii and the splendors they once wrought.

For some time those who in the West dream also fair dreams of the East, have wondered when that mightiest of all the Genii, which we have seen soaring over the Rocky Mountains, and plunging beneath the Alps, would find his way to the region of those oriental ruins and build over them grandeurs of which their past achievements were but sketches and studies. A railway to India has been hitherto but a daring dream. But now it has gained a consistency and definiteness which promise that to the challenge of the Pacific Railway and the Mount Cenis Tunnel, England will reply by a stupendous engineering feat which will enable a man to leave London and reach India within five and a half days from the time of starting.

Two valiant civil engineers, Messrs. Low and Thomas, of Wrexford and Cardiff, have just laid before the Prime Minister of England, and the governments of France, Italy, Austria, Turkey, and Persia, a remarkable clear and simple scheme for a railway to India. According to their project the line would follow the existing line from London via Calais, Paris, the Mount Cenis Tunnel, Turin, Milan, to Trieste. From Trieste the new line would pass through Illyria via Flume; through the western boundary of Croatia, via Ortoac and Gracac, thence through Dalmatia via Kuin, east of Darnis and of Spalatro, across the entrance to Cattaro, leaving Austrian Territory at Lastua. Entering Turkey in Europe the line would pass by Alessio, Durazzo, Pekini, Kasbonates, up the valley of the river Berat-

na via Berat, Dabrin, Karidschi Plia, Kastoria, Karaferga, Golokia, Beshik, Orphano, to the Bay of Orphano; then skirting the Mediterranean coast by Jendischeikarasu, Maronia, Keschian, to Rododchig, on the sea of Marmora, along whose edge it would run, via Turkamendi and Bujuk-Sshekmedshe, to Constantinople. Having here crossed the Bosphorus by a railway steam ferry, the train would proceed through Asiatic Turkey by Pendik, curve around Izmiö Gulf, touch the western end of Isnik, and by way of Shugut, Osman, Dinair, (where a branch might be thrown off to meet the Smyrna and Aidin Railway), Egedir, enter the Valley of the White River, and pass down it to reach the Mediterranean at Adulla. Along the coast; then, the line will run, touching many towns and cities, Alaya, Lelenti, Anamur, Ayash, Tarsus, Adanah, and along the plane of Issus, round the Gulf of Iscanderro, passing Alexandretta, Beilan, Bakras, near Antioch, (where a branch might be thrown off to Jerusalem), Aleppo, it reaches the Euphrates at Bales. To the Valley of the Euphrates it would cling until it entered that of the Tigris, near Bagdat. Following the Tigris it would cross the Schatt al-Hai Canal and proceed to Bassorah, and enter Persia at Mohamrah. In Persia the route would be along the north shore of the Persian Gulf via Mashoor, Lirineh, Bander-Jellim, Bishire, Andiaro, Taurie, Girza, Mospa, Bander-Abbas, Terai Jask. In Beloochistan the line would run along the coast of the Arabian Sea via Gerishk, Kungoon, Purug, Cboohar, Backer, Gwuter, Gwadel, Harmara, and Lonneance; thence, curving round Cape Monze, the railway enters India at Kurachee. The distance is exactly five thousand three hundred and thirty-nine English miles. Of this, one thousand one hundred and seventy miles of rail are completed. The maximum of cost estimated by Low and Thomas is forty millions of pounds.

These eminent engineers have completely mastered the physical facts of the country through which they propose that this railway shall run; they have gauged every rock, measured every stream, and know the height and breath of every hill; and they have shown to the satisfaction of various eminent Civil Engineers,—among others of James Brunless, C. E., member of the Council of the Civil Engineers' Institute,—that their plan is feasible and their estimates sufficient. I have reason to know that Mr. Gladstone has become deeply interested in the scheme. The interest which England has in being brought nearer than the twenty or twenty-five days now required to the two millions of her Indian subjects is so great, the advantages that such an achievement would add to the commerce of the country by opening the whole East to it, warrant the prophecy that this proposition will, when it becomes popularly known, (as it is not yet), excite a hearty enthusiasm. The brave engineers are able to demonstrate that there is no obstacle to their plan more serious than forty millions of pounds. They believe that if the co-operation of the various nations concerned can be secured, and companies formed in them to raise each their moiety of the capital, the undertaking can be completed in about three years from its commencement.

Of course there will be unbelievers enough, who will denounce this scheme as Utopian. The successors of those who at one period proved satisfactorily that the Atlantic Ocean could never be navigated by steam, at another that an ocean cable was impossible, and even lately that the Alpine tunnel would be a huge failure, by reason of the impossibility of ven-

tilating it—are still in existence, and will, no doubt, survive many more discomfitures than they have. Chimæras, Brigands, all manner of enemies will be conjured up to resist the Genie on his return to the East at every step. Mr. Disraeli once said: "The impossible is always coming to pass," and the phrase has become an English proverb; and yet no country which has done so much to show what the combination of money and skill can accomplish has so many persons who are ready to doubt the practicability of anything which in any wise appeals to the imagination. As it used to be ruinous (in pro-slavery days) to a bill brought into Congress to call it humane, so John Bull has an invariable misgiving about any scheme which has a touch of poetry about it. Nevertheless, the fault this time will not be with the English people. No intelligent man in this island since the Pacific Railway and the Alpine Tunnel, is willing to be the first man daring enough to pronounce the word "impossible."

The delay—if it must be, and it can only be delay—will probably be caused by the difficulty of bringing the various nations, through whose territory the line must run, to appreciate its value as the owner of India can appreciate it. And I regret to have to express the apprehension that the difficulty will not be so apt to come from Turkey, where English influence is supreme, nor Persia, which needs only such a railway this day, to save her from famine, as from France. France has already shown a lamentable jealousy at the prospect of seeing the advantages at Marseilles gradually passing by the Mount Cenis Tunnel to Brindisi. But if with this the susceptibilities of the Suez Canal—now the main road to India—be conjoined, there is no doubt that France may throw many obstacles in the path of such a scheme.

And it will be of not a little importance in forecasting the future of France to watch what course she will pursue both toward the Alpine Tunnel and to the proposed railway to India. It would be the easiest thing in the world for her to divert the course of the iron highroad to the East into Germany. Already the only criticism made by eminent engineers upon the line proposed by Messrs. Low and Thomas, is that if the route be taken by Vienna (instead of Mount Cenis) it will be able to avail itself of the line which is already being constructed between Vienna and Constantinople. By this means there would be a further saving of about one thousand miles in the work of construction contemplated by them, and a proportionate reduction will be made from the forty millions. The probability is, indeed, that in the end the railway will take this course—through Germany, via Vienna, that is—and if so, it will be a more disastrous blow to France than Germany has yet struck.

However, as we are passing Bagdat, on our imaginary line, we may remember that Sheikh Saudi said: "The Tigris will flow by Bagdat, after the race of Califs is extinct." What the Persian poet foresaw of the Califs we may assume of the Cavillers. The great stream of human civilization, and of that material progress, which is after all its best symbol, will flow on, finding its way amid the invincible channels or necessity, and will benefit the human race long after the transient whims of men, or merely municipal needs of this or that generation have become extinct.

Though one of the finest paintings of Turner was a railway express train scorning the storm, Mr. Ruskin has uttered his anathema upon the railway. He has imperiously excluded the very notion of proximity to a rail-

way station from his new Arcudia. But I fancy that even he would find beauty and humanity in a steam engine if he saw it speeding eastward,—feeding Persia in her famine,—awaking crumbling Antioch and perished Palmyra, to new life and calling the vanished splendors of Bagdat, and the literary glories of Ispahan and Schiraz back again to the earth. With the first train that travels that path will journey the interests of the scholar, the hope of the poet, and every friend of man will know that at its end are the rivers and the bowers of Eden.

M. D. C.

IRON MINES IN MISSOURI.—For many years, writes a correspondent of the *St. Louis Republican*, iron ore has been known to exist in Camden county, Missouri, in great quantities, but the country being comparatively new and wild little interest was manifested in it. Recently, however, an extensive exploration has been quietly made, the result of which has exceeded the anticipations of the most sanguine. Two gentlemen, Dr. A. Condee and Alexander Campbell, after making a thorough investigation of the country, are said to have purchased several thousand acres of what they consider to be the best of the new iron region. The lead, or belt, as it is termed, is about 8 or 9 miles long, on the Osage river and along what is known as Bollinger creek, a small tributary of the same. It is found in both Camden and Morgan counties, but the largest deposits are in the former. So far as at present discovered, it is found on both sides of the hills or mountains there, and passing through, or indeed forming the same, as high as 50 or 60 feet, with but about 5 or 6 feet of surface dirt. Its depth is unknown, but is supposed to extend to the base. In respect to richness the ore is said to be equal to about 77 per cent. pig metal—better than the Iron Mountain ore, and about equal to that obtained at Pilot Knob. The location of this new discovery is about 100 miles above the mouth of the Osage, and the survey line of the St. Louis & Fort Scott Railroad runs near the west end of the tract purchased by the gentlemen above mentioned.

—At a meeting of the stockholders of the Toledo, Wabash & Western Railroad, held at Toledo, Ohio, October 4, the following persons were elected directors: A. Boody, A. M. White, A. B. Baylis, Isaac H. Knox, George Cecil, William Kidd, H. F. Clark, Augustus Schell, S. B. Chittenden, J. H. Banker, A. Stone, H. B. Payne, A. M. Ferris, Sheppard Gandy, R. Capron. A. Boody was elected president, John M. Drummond, assistant president, and A. Anderson, vice president. All of the above were in last year's directory except Messrs. Payne, Ferris, Gandy and Capron. One of these takes the place of Warren Colburn, of Toledo, one of James Spears, of Lafayette, Ind., one of C. M. Smith, of Springfield, Ill., and one, according to this report, of J. H. Drummond, of Toledo, who appears to be retained as assistant president, but retired from the directory. Six of the new directors, Clark, Schell, Banker, Boody, Stone and Payne, are also directors of the Lake Shore & Michigan Southern. Mr. Baylis is a New York & Harlem director, and others, we believe, are counted as "Vanderbilt" men.

—The Omaha & North-western Railroad, on the 11th inst., was completed 40 miles, and received patents for 80,000 of the 100,000 acres of the State granted lands. It is progressing steadily from Omaha through the Missouri valley to an ultimate connection with the Northern Pacific.

The Richmond Coal Field.

While the coal mines are multiplying, and coal land speculation is spreading throughout the anthracite and bituminous regions of the Northern, Middle and Western States, a new interest springs into life in the old coal regions of the South. The war destroyed the proceeds of the previous years, and swept away the puerile establishments with which the sluggish population satisfied their slight necessities. But in doing this the war made novel and exacting demands for a larger supply of iron and coal, compelled a more systematic exploitation of mines, and the building of extensive iron works in districts before neglected. Thus have been laid the foundations of a different order of things. A new era has opened for the Southern landholder and capitalist; and the beginning of this new era has been marked by a collateral expansion of the railway system along the seaboard. Railways can be cheaply built, cheaply maintained, improved and extended, when iron is made in their neighborhood. They soon erect their own rolling mills. But iron can be cheaply made only where fuel is abundant and a local population can be collected. Charcoal furnaces must needs be small and scattered, for every 35-foot stack requires 10,000 acres of land to keep up its stock of charcoal. Whereas 16 60-foot stands together in a row at the mouth of the main shaft of the Creuzot coal mines.

Charcoal cold blast iron made from magnetic ore is certainly the best in the world; but it is also the dearest; not because it is the best, but because so little of it can be made. For our capitalists have not yet learned that it is safer in the long run to invest in a dozen small charcoal stacks well located, than in one or two large anthracite or coke furnaces located under ordinary circumstances. There are of course exceptions, but they are much rarer than people have any idea of. If all the capital which has been sunk in iron making on a great scale had been distributed among a very large number of iron works on a small scale, American iron would have always had the integral value of the best Swedish iron, would have been comparatively cheap, and we should now have at command a much larger number of expert iron masters and iron workers in all parts of the United States. We import over 400,000 tons of rails and 150,000 tons of pig iron from England this year, because American capital, invested in iron works, has not been invested in the best way for securing the largest possible amount of the best iron at the lowest figures.

Those who have not thoroughly studied the subject may dispute this; and some may dispute it who have spent years in the business, and have made fortunes, perhaps, by anthracite coal iron works. But few old hands at iron making in other districts of the country will demur to the proposition, that an abundance of cheap capital applied over wide ranges of country, is all that is wanting to insure the profitable manufacture of the very best of iron, in such abundance as to meet all the demands of our railway world, and leave also an abundance for the common industries of the nation. This desirable procedure, however, is impossible in the current condition of the American money market, and with those impatient and speculative sentiments in vogue unhappily with so large a proportion of investors.

The tendency is still to plant money for future large profits, instead of for a present and continuous moderate and steady business. The time must come when people in America shall find themselves compelled to look the law of life straight in the face: that law of daily

work for daily pay, and daily pleasure in daily work, which sways dense populations. But so long as there is a free vent there can be no high pressure; and the West is a wide vent which still prevents the Eastern States from feeling any pressure approaching that of over population. Until this pressure be applied, the individual members of American society feel too free to move about, to suffer any intense business anxiety. If they do not achieve success in one line of action they will in another; why should they be anxious? Yet it is only this "anxious care for the morrow" which can balance the minds and stiffen the principles of most men, and make unsullied integrity, unswerving industry, persistent thrift, and self denial, recognized virtues necessary for all.

Meanwhile consolidations, large operations, extensive plants, are the order of the day, involving heavy incidental expenditures, tempting irresponsibilities, waste, malpractice, high price of raw mineral, and low qualities of finished products. Our iron must be made chiefly out of coal. The occupation of new coal lands at fancy prices, not to work, so much as to hold, or to transfer at an advance to those who will hold, is going on at a greater rate than ever. Every avenue to the coal districts is being seized by some railway company; and tracts of coal land along every new line of railway are in the market at fabulous prices. It is impossible to fix a normal price; all prices are speculative. Beds of iron ore are sought for eagerly; and in every case the effort is made to monopolize a district so as to exclude competition. Hence every scheme is overloaded and staggering under a needless yet crushing burden. No one wishes to "work" the property, but to "put it into shape" to sell to some one who will work it, of course at an immense advance. Poor men have been gathering up leases, over many miles square, for twenty and thirty years past, at nominal mine royalties, and now put their titles into company operations, in concert with capitalists who are themselves contented with nothing less than cent per cent profits. Is it any wonder that nothing seems to succeed well? The mineral wealth of the country is too great to be monopolized. The manufacturing demands are too small to bear cent per cent profits. Both buyers and sellers are checkmated by their own greed. Honest industry advances slowly; the whole land swarms with unrealized projects and incipient operations, stopped at the start. Back lands are forced upon an unwilling because overloaded market, and old fields of industry close at hand stand with all their advantages unrecognized, or forgotten.

We have often turned with a sort of wonder to regard the Richmond coal basin. Its history is very strange. It was one of the earliest opened by the miner. It is the solitary one at tidewater and near a State capital; for the Rhode Island coal basin does not deserve the name. It contains several beds of coal, and one of these is sometimes of great thickness, sometimes 60 feet. It is mined by shafts on the English plan; and affords a variety of fuels, ranging from gas coal to native coke. One would have expected its complete development long ere this.

A little reflection, however, will serve to explain the phenomenon. The Richmond coal basin is in Virginia; and Virginia has been in a profound sleep for a hundred years, a sleep undisturbed by dreams of any other than a political complexion. Industry was always ignoble in Virginia. Speculation in money-making was always under a sort of ban. Investment in unwieldy breadths of soil was the

only vogue. The manufacturing element of society was carefully excluded from the Commonwealth. Wood was always plenty for the hearth and the forge; why raise stone coal, where there were neither steam saw mills, cotton mills or woolen mills, coke stacks, or puddling furnaces in the region? The Tredegar iron works could supply itself from Baltimore, or raise enough from a single shaft, with fifty black miners, to supply all its own needs. From the Blue Ridge to the sea shore, and from the Potomac to the Savannah, no one thought of using stone coal for any purpose whatsoever. If they had, the capacity of the Richmond field would have been well developed; for it stands, or stood, alone, the solitary source of mineral fuel for a region five hundred miles long and two hundred and fifty miles wide. The Deep river basin was almost, and the Dan river basin was wholly, unknown. Even now the latter remains practically untouched, and the former is not to be compared with the Richmond field for situation and size of beds.

McClure, the father of American Geology, made a map of the Richmond basin in 1817. It was at that early day exploited only by shallow slopes upon the edge of the principal coal bed, where it slants up to the surface along the line of granite rocks which mark the eastern limit of the coal measures; and these old pits, like those of the old York Company's workings, in the Pottsville neighborhood, are much dreaded; because, being filled with thousands of tons of rain water, they stand ready to pour a deluge down when tapped from below by miners putting up new breastworks unguided by any chart.

The first clear description of the Richmond basin was published by R. C. Taylor in 1834 (see Transactions of the Geological Society of Pennsylvania, Vol. I, page 275, plate 16). Mr. Taylor afterwards embodied the facts as known to him in his well known Statistics of Coal, a second edition of which was edited by Prof. S. S. Haldeman in 1855. Mr. Taylor's view of the structure of the basin is given in a wood cut diagram on page 291.

Accustomed to the downthrow faults of England, Mr. Taylor represents the irregularities encountered by the miners in that form. Mr. Daddow, on the other hand, accustomed to the study of the faults of the anthracite basins of Pennsylvania, gives an entirely different view of the structure of the Richmond basin on page 396 of his book, entitled: Coal, Iron and Oil, published in 1866. We believe that Mr. Daddow's view is more correct than Mr. Taylor's. Following Prof. W. B. Rogers, he ascribes the irregularities of the coal beds to previous irregularities of surface at the bottom of the lake or estuary in which the Richmond coal measures were deposited. Granite, gneiss and mica slate surround the Richmond coal field, and form its bed. Upon this face of granite was deposited a coal bed varying from 10 to 60 feet in thickness, dipping east from 25° to 86°, on the west side of the basin, and dipping west from 20° to 40° on the east side of the basin.

We have never heard of a good map of the Richmond field. The diagram map which Mr. Daddow gives on page 395 is merely intended to show about where in Virginia this coal field lies. Nor does Taylor furnish anything better.

The Midlothian mines like all the other operations of the region were suspended during the war, but have recently been sold to a Western New York capitalist who is reopening the mines. The Clover Hill property has been in operation several years since the war; and the property just south of it, on Winterpock

creek, and between it and the Appomattox river has been more recently shafted and worked; the coal being sent to market over the Clover Hill company's railroad.

A new history is commencing for the Richmond coal field. Richmond itself is growing more rapidly than most Western cities. The competition excited between steamboat lines and railways, and between rival railways—the extension of Pennsylvania influence through Richmond, Raleigh and Charleston to Savannah and Atlanta—the revival of every kind of business in Virginia—the revolution in men, manners and business arrangements in North Carolina—the energetic consolidation and extension efforts of the South Side and Virginia & Tennessee great interior through line—the efforts made to complete the Virginia Central and bring the trade of Cincinnati and Chicago to Norfolk instead of to New York—the purchase of large tracts of iron country further south—in a word, the enormous preparations made for covering this long neglected section of the United States with a network of first class transportation facilities, all naturally centering at Richmond, has suddenly called into public notice the long undervalued coal field in its vicinity.

Large tracts of land are now in market, the owners being old proprietors and landholders in other parts of the State, members of the aristocracy of the ancien regime, wise enough to accept the new situation, but not yet inspired by a rage for speculation. With large hereditary possessions and but little ready capital, they are taking advantage of the universal inquiry for available coal measures to realize this portion of their estates as the most marketable and immediately valuable. Hence, while they recognize the intrinsic worth of areas covering millions of tons of coal, they are aware that to reach this coal at depths varying from 500 to 1,000 feet, capital is needed in much larger quantities than they can command, and an experience in planting such capital which their own past lives has not given them. They are very moderate, therefore, in the prices they put upon their tracts, and this is turning the attention of Northern capitalists towards them.—*U. S. Mining Register.*

—The Vicksburg *Herald* says: "The Memphis & Vicksburg Railroad Company is ready to place ten miles of the road under contract, and desire to receive bids for the construction of the work. As soon as a contract is made for this section of ten miles, the Company will be prepared to let contracts for an additional fifteen miles. The profiles and specifications for this additional section will be ready at an early day, and as soon as they can be prepared the letting will be advertised. It is the object of Gen. Adams and the directors to push forward the work on the lower end of the line with all practical dispatch in order that the lowest portion of the route may be passed before the winter rains set in, and be entirely secure from any danger of overflow, before the season of high water arrives. The portion of the road now offered to contractors runs over the lowest grounds on the whole route, and hence the importance of its early construction."

—A project is on foot for building a narrow gauge railway from Paducah, Ky., to Paris, Tenn., and it is received with much favor along the line of the proposed route.

—The Lehigh Valley Railroad Company announced a quarterly dividend of 2½ per cent. payable on the 16th inst.

NEW YORK UNION DEPOT.—Trains on the Harlem Railroad will run from the new Union depot on Oct. 9; those on the New York & New Haven Railroad on Oct. 16; and those on the Hudson River Railroad on Oct. 23. Trains will not be allowed to run within a mile of each other, and their movements between the city and the Spuyten Duyvil Railroad Junction will be regulated by a new system of electrical signals. Joseph H. Franklin has been appointed depot master.

—The Osage division of the Missouri, Kansas & Texas Railroad, which has been in operation for some months from Holden, Mo. (on the Missouri Pacific Railroad, 43 miles from Sedalia), westward to Harrisonville, about 22 miles, was completed on the 24th ult., to Paola, Kansas, 32 miles further. Paola is a station on the Missouri River, Fort Scott & Gulf Railroad, 43 miles from Kansas City. The contracts have been let for an extension of the road from Paola westward to Ottawa, 22 miles, and surveys have been made on an extension of the division eastward from Holden—one about 40 miles long to connect with the main line of the Missouri, Kansas & Texas at Greenridge, 9 miles south-east of Sedalia, and one altogether north of the Missouri Pacific down the Blackwater river in a direction north of east to Boonville, about 75 miles, there to cross the Missouri and connect with the Louisiana & Missouri River road.

—The earnings of the Burlington, Cedar Rapids & Minnesota Railroad Company, for the week ending Sept. 14, are \$27,502, as against \$14,206 for the corresponding week in August. The above return makes about \$8,500 annual earnings to the mile.

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The Railroad Record.

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STATISTICAL REPORT

OF THE

Resources and Prospective Business

OF THE

Kentucky and Great Eastern Railway.

Col. S. W. MORRIS,

Pres't Kentucky & Gt. Eastern Railway:—

At your request, I have examined all the statistics, commercial and geographical relations, and natural resources, connected with the line of the Great Eastern Railroad. For this purpose, I have assumed Cincinnati, Ohio, and Frederick, Md., where direct connection is made with running roads to the cities of Baltimore, Philadelphia and New York as the termini of the road.

At the former point it will connect with all the roads in the valley of the Ohio, and at the latter with those in the East, now existing, and a direct line be made with New York.

In looking to the future of a new trunk line of road, there are, it seems to me, three questions to be answered: 1. What, if any, are the peculiar advantages of the road? 2. Will it simply do the business of an already settled country, or will it develop a new one? 3. What are the actual statistics of the country on the road, and what will they probably be when the country is developed? Nothing is better known, in relation to railroads, than that some most profitable railroads have become such by developing the country, and not from the

country as it was. So, nothing is better known than that, in regard to coal, iron and lumber; no part of America has more to be brought out and carried to market than that through which the Great Eastern passes. In view of these facts, I shall endeavor briefly but accurately to answer the above questions.

1. What, if any, are the peculiar advantages of the Great Eastern? Nine-tenths of the railroads in the country pass through a purely agricultural country. Four fifths of them pass through what may be called a thick settled country, of which the future growth will go on at a moderate rate. Not more than a dozen control any great trunk route, whether in themselves or by connections. If now we look to the elements of the Great Eastern, we find that it has *all* the advantages which are peculiar to any road, except that the agriculture of Western Virginia is not so great as in the level and bottom lands north of the Ohio; but when we look to the great agricultural as well as mineral development of North-eastern Pennsylvania, now covered with railroads, we see that it needs only railroads to carry off the coal and iron, in order to increase the culture of lands, as well as the digging of mines. The Great Eastern has, therefore, *peculiar* advantages, which may be stated thus:

1. It is a through trunk line from the center of the Ohio valley to the Atlantic cities; and shorter from Cincinnati to New York than any other. This fact will be admitted by all observers of railroad operations. I find by the reports of engineers, that the surveyed distance from Cincinnati to New York by the Great Eastern is only 640 miles, viz:

	Miles.
Cincinnati to Catlettsburg, Ky.....	130
Catlettsburg to Winchester, Va.....	260
Winchester to Frederick, Md.....	57
Frederick to New York, by direct line.....	193

Total from Cincinnati to New York...640

The shortest distance now traveled from Cincinnati to New York, and which is the main line of travel at this time, is the Pennsylvania route through Pittsburg. The distance on that line is 749 miles, and is now traveled in 27 hours. The distance on the Great Eastern will be 640 miles, and can be traveled in 23 hours, at the same rate of speed. The Pennsylvania road has taken two-thirds of all the passenger traffic between Cincinnati and New York and Philadelphia, because it has the shortest line and the quickest speed. The conclusion from these facts is inevitable. If we suppose the Great Eastern now made, it must and will take more than half of all the *entirely through* passengers between the Atlantic cities and Cincinnati. Table 6 (annexed) shows that between Cincinnati and the Atlantic cities this class of passengers numbered 160,000 on all the roads in 1870. This is ascertained by tracing out the “through” passengers on the trunk and connecting lines. This number is in-

creasing at a very rapid rate, and it will be entirely safe to say that at the completion of the Great Eastern the number will be at least 200,000, of which the Great Eastern will have half, because of the great shortening of distance and time. This, then, is one *peculiar* advantage.

Another one is that it passes through a country which although old as compared with the Western States, there is a smaller amount of railroads than in any part of our country, except the extreme West. The reader has only to take up a map, and he will see that from Central Ohio to the valley of Virginia and Tennessee there are no railroads, except the Baltimore & Ohio, in the extreme east of this region, and the Chesapeake & Ohio, now making. Over the whole region of Eastern Kentucky, West Virginia, and the north-east of Virginia, there are scarcely any means of carrying off any of the wonderful products (for such they are) of coal, iron, lumber, salt, slate and oil of that country. The result is, that only in the narrow valley of the Kanawha has there been much attempt at development. If it be said that the population is thin in regard to furnishing passengers, that is more than counteracted by the greater breadth of country drained. In fact, in the direction of the line of the Great Eastern, there is really no competition, and can not be for a great many years. The control of this great breadth of country is another peculiar advantage.

Again, another peculiar advantage is that there is no road in the country, or perhaps the world, which goes *for so great a distance through a region of coal and iron*, with their attendant strata of salt, lime, oil and stone. I say this after a full consideration of the immense coal district of Pennsylvania, and of that in Missouri. From about 80 miles above Cincinnati, to Winchester, Va., a distance of 310 miles, the whole country may be said to be a coal mine, and most of it an iron mine. In Eastern Kentucky, *fifteen* counties are in the great Appalachian coal field (see D. Dale Owen's Geology of Kentucky). Seven of these counties are on or adjacent to the Great Eastern Railroad. In West Virginia, every county on or near the road is in the great coal field. So, also, of iron. The counties of Greenup, Carter and Boyd in Kentucky, have already immense iron works, and are producing large amounts of pig iron. So, also, of the north-eastern counties of Virginia. Nearly all of them produce iron, and great iron works are already in operation there. I say, therefore, that there is probably no where, a railroad which passes through such a great extent (300 miles) of coal and iron, with all the auxiliary elements of stone, lime, lumber and oil. It is, therefore, very obvious that this is a real and great advantage of the Great Eastern Railroad. It is entirely true that this is an undeveloped region; but the direct object and effect of railroads is to develop the resources of a country.

It is impossible to say, in advance, how much of the immense quantities of coal and iron which will hereafter be mined and carried off from this country will be carried on the Great Eastern; but we can form some idea of what future results will be by referring to the experience in Eastern Pennsylvania. It will be seen, by Table 7th, that the enormous amount of 6,000,000 tons of coal are carried from eight counties of Eastern Pennsylvania, by no less than twenty railroads. If we suppose that a *tenth* of this amount were in the future to be carried by the Great Eastern, it would make an immense business; and there is no doubt that in a few years it will do at least that. I have now answered the question what are the peculiar advantages of the Great Eastern?

2. The second question is: Will it do the business of an already settled country, or will it develop a new one? This question I have already partially answered above. In regard to original settlement, East Kentucky and West Virginia are comparatively old settlements; but in regard to cultivation and development, except some small districts, they are almost wholly new: that is, they are almost wholly undeveloped. The small settlements on the Ohio river are the exceptions. But while this is the fact, there is a constant and an unlimited demand for the peculiar products which that region can furnish. All through the valley of the Ohio, north of the Ohio and West, there lies a vast plain of the richest soil, and the greatest amount of agricultural products. That region is filling up with farmers, towns and cities. These all want coal, iron, oil and lime. Hence the great problem of the day is, to develop the great deposits of coal, iron, salt and oil in the upper Ohio valley. Nothing can be supposed to do this better or quicker than the Great Eastern Railroad. There will be other roads, such as the Baltimore road, and the Chesapeake & Ohio, which will do much in this way; but if the reader will examine a map, he will see that both those roads pass through West Virginia transversely to the Great Eastern, that is, north and south, in less sections of country. Hence, the field of the Great Eastern is much the largest, and in regard to development can undoubtedly accomplish the most. The *Baltimore & Ohio road* has shown by the immense transportation of coal from Western Maryland to Baltimore, what can be done in this way. The Great Eastern, therefore, will largely operate in developing the immense region of mineral deposits between Maysville, Ky., and Winchester, Va. What that will be, we can gather partly from existing facts, and partly as a deduction from the experience of other roads, and the development of other sections of country.

3. What are the actual statistics of the country on the line of the road, and what will they be when the country is developed? In tables 1, 2, 3 and 4, are given the existing sta-

tistics of the particular counties through which the Great Eastern passes. But these statistics show almost nothing of what that country would produce, if there were any facilities of transportation. Hardly any of the railroads beyond the Mississippi, were made through a country which, before the roads were made, showed any great surplus production. The roads did more for the country, than the country did for the roads. Yet, no roads in the country promises to be more profitable, than they will be. Hence, we must endeavor to form some idea of what will be the state of things when this road is made. This development will relate almost wholly to material productions of the country developed by this road. Let us now look at a few facts connected with the effect of making the Great Eastern.

1. In table 2, it will be seen that the river trade from Cincinnati to Catlettsburg on the Kentucky side, amounts in value to \$13,000,000; or, about \$100,000 per mile. From Catlettsburg to Wheeling, the river trade amounts (on the Virginia side) in value to \$33,000,000, (including Wheeling). Thus a distance, counting on a direct line of over 300 miles on the south side of the Ohio, furnishes a commerce valued at \$50,000,000. The value of articles transported on the New York Canal was found to be in round numbers \$50 per ton, and the tonnage of the Ohio river is nearly of the same character. It may be safely assumed that the present tonnage of the Ohio river, from the Kentucky and Virginia side, amounts to 1,000,000 tons. This is nearly all taken from a narrow slip on the Ohio, with the single exception of the Kanawha river. Many articles will not bear wagging to the river, except for a short distance. We assume, therefore, with confidence, that a railroad passing East and West, in the direction of all the great cities, having a country without competition, equal to 40 miles in diameter, will when in complete operation, transport more than now goes on the Ohio from that side. How will that be made up? While we can not state amounts positively, it is easy to show what are the main articles, and in what way they will be developed.

1. *Of Coal*—Cincinnati, Newport and Covington, and their surroundings, will take for this year, 50,000,000 of bushels of coal. This is 1,500,000 tons. While we may concede that half of this will come down the river, it is very evident, that hereafter most of it must come by rail, especially for all the iron works on the line of the road. If we suppose that the rail transportation is divided among three roads, yet there will remain 250,000 tons for the Great Eastern. Taking an average distance of 150 miles, it can be laid down for 6 cents per bushel for transportation, and successfully compete with the river.

2. *Of Iron*—From the statistics of tables 2, 3 and 4, it is evident there will be at once nearly, or quite 200,000 tons of iron, in all forms, raw and manufactured, carried on the road.

3. *Of Lumber*—In the U. S. Statistics for West Virginia and Eastern Kentucky, will be observed returns of large amounts of sawed lumber. This portion of the country is remarkable for immense quantities of fine timber, and the time has come, when from its scarcity on the North bank of the Ohio—Cincinnati and other large towns must rely for timber on that part of the country. 100,000 tons will not be too large an amount to allow for this article.

4. *Of Produce*—Except a few large counties, the section lying on this road is not now remarkable for agricultural products. As we have remarked, the development made by the road will cause a rapid increase in the culture of land. Yet, it will be seen, that the commerce of Maysville amounts to \$8,000,000 per annum, and a large part of that arose from the products of agriculture. Tables 3 and 4 show, that the Great Eastern may rely on 200,000 tons from this source.

5. *Miscellaneous Products*—Among these many things may be enumerated, such as oil, salt, lime, stone and numerous articles, which though small in each one, make a large amount on a railroad. We may put these at 100,000 tons.

6. *General Merchandise*—This consists in manufactures and dry goods. These are, compared with coal and iron, of much less weight. But the quantity required, in a great country, heretofore almost shut out for want of communication, must be very large. Looking to the large amount of products for which merchandise must be returned, we put it at 200,000 tons.

In the above estimates, we have taken the statistics of what is, and not those which will be. A district which is 430 miles long, and averages a breadth of 40 miles, makes an area of 17,200 square miles, which will be for transportation purposes, wholly within the control of this road. With these observations, I submit a series of tables and estimates from them:

TABLE I. Resources for a railroad on the line of the "Great Eastern" in Kentucky.

Counties.	Popu-lation.	Sq. Miles.	Grain, Bushels.	No. of Animals.	Mineral Tons. Iron.
Lawrence.....	8,497	500	320,000	34,808	20,000
B. yd.....	8,573	200	162,000	10,261	20,000
Carter.....	7,569	600	497,000	31,658	50,000
Greenup.....	11,463	400	434,000	18,112	.....
Lewis.....	9,115	360	597,000	26,581	.....
Rowan.....	2,991	230	180,000	9,855	.....
Fleming.....	13,398	400	96,000	50,490	.....
Nicholas.....	9,129	300	160,000	52,816	.....
Mason.....	18,127	300	1,800,000	62,629	.....
Bracken.....	11,409	300	840,000	27,369	.....
Pendleton.....	14,630	400	950,000	43,109	.....
Campbell.....	77,460	300	600,000	9,855	.....
Aggregate.....	141,617	4,250	3,498,000	377,674	100,000

NOTE I—The population is given exact from the census of 1870.

2. The square miles are an approximation, it being assumed that there could be no competition within 30 miles of the river.

3. The iron products is a *minimum*, the returns of 1870, not having been given to the public. I have estimated it from what was common information.

TABLE 2.—Ohio River Trade, from the section tributary to the Great Eastern.

Places.	Exports.	Imports.	Estimated Value.	Remarks.
Catlettsburg ..	Lum'r, coal, etc.	Gen'l.	\$590,000	B. Sandy trade.
Ashland	Co-l. produce.	eral	50,000	Furnaces
Belleville	Lead, metal, b'k	Mer-	250,000	
Anan's Furn'e	Pig Metal.	c an-	10,000	
Oil Works	"	dise	150,000	Fur. & ref.
Greenupburg ..	Pig metal, coal	"	1,500,000	Furce, e.c.
Rus Landing ..	L'th pro. hides	"	50,000	Tanneries.
Franklin Fur'e	Pig metal iron	"	200,000	Furnace.
Excelsior	ime, produce	"	100,000	Lime kilns
Springville	Whis'y, leath'r	"	20,000	Tan. & dis.
Quincy Land's	Pig metal, bk.	"	100,000	Furnace.
Boone Furna'e	"	"	100,000	
Fairview	tone, bark	"	50,000	"
Vanceburg	Flour, leather.	"	200,000	"
Stout Land'g	Grain, fruit.	"	10,000	"
Concord	Flour, leather.	"	75,000	S'w f'rm'
Springdale	Grain, etc.	"	10,000	"
Marysville	Pork, tobacco,	"	8,000,000	Oil Works
Charlestown ..	"	"	20,000	"
Dover	Pork, lead, etc.	"	12,000	"
Augusta	Grain, tobacco.	"	25,000	"
Rock Spring ..	Whis'y tobacco	"	20,000	"
Metcalfe	Tobacco, etc.	"	12,000	"
Porterville	Tobacco, etc.	"	100,000	"
Stepstone	"	"	20,000	"
California	Wood, prod'ce	"	10,000	"
26 Landings ..			\$12,487,000	

TABLE 3.—The surpluses which are available for Market, deduced from Table 1.

Counties.	Tonnage surplus of Agriculture.	Tonnage of Minerals.
Lawrence ..	6,000 f'm animals, grain	
Boyd	1,000 "	20,000 tons of iron.
Carter	5,000 "	20,000 "
Greenup	4,000 "	35,000 tons Iron, etc.
Lewis	6,000 "	
Rowan	"	"
Fleming	16,000 "	"
Nicholas	16,000 "	"
Mason	30,000 "	"
Bracken	8,000 "	"
Pendleton	6,000 "	"
Campbell	10,000 "	"
12 Counties.	109,000	95,000 tons.

The above table is taken from the report of the Board of Trade in Cincinnati, and is believed to be strictly accurate. The aggregate commerce from the landings on this line of the Great Eastern road amounts in value to near \$13,000,000. One considerable item which did not enter into Table 1, is tobacco, which is raised in large quantities.

TABLE 4.—Resources for a Railroad on the Line of the Great Eastern, from Catlettsburg, Ky., to Frederick, Md.

	Population.	Grain (bu.).	Animals (No.)	Mineral (tons).
Wayne	7,852	310,000	25,000	
Cabell	6,420	332,000	21,000	
Putnam	7,794	310,000	22,000	10,000 tons.
Jackson	10,300	340,000	25,000	
Wirt	4,204	150,000	15,000	
Roane	7,332	150,000	20,000	
Calhoun	2,939	95,000	9,000	
Clay	1,195	55,000	6,000	
Braxton	6,480	165,000	15,500	
Gilmer	4,333	156,000	13,000	
½ Kanawha	11,174	203,000	15,000	60,000 tons.
½ Ritchie	4,527	100,000	11,000	1,000 tons.
Salisbury	8,023	280,000	30,000	coal and oil.
Lewis	10,175	250,000	21,000	
½ Doddridge	3,538	75,000	5,600	
½ Barbour	5,156	170,000	20,000	
Randolph	5,563	90,000	22,000	
Tucker	1,907	40,000	6,500	3,000 tons iron.
Hardy	5,518	400,000	31,200	
Wm. Phillips	7,643	530,000	57,000	
Frederick	16,507	646,000	55,000	15,000 tons iron.
Shenandoah	14,936	580,000	21,000	1,000 tons iron castings
Warren	5,716	360,000	22,000	

Darke	6,570	650,000	24,200	
Louden	20,929	1,720,000	65,000	3,000 tons iron.
¼ Harrison	8,357	200,000	25,000	
Frederick (Md.) ..	47,372	2,450,000	90,000	
27 Counties	254,363	10,825,000	692,000	93,000 tons.

TABLE 5.—Showing the Proportion of Local Passengers from a given Population on a Railroad, as Determined by Experience.

Railroads.	Population on road.	Local Passengers	Receipts.
Dayton & Mich	166,174	279,869	\$207,869
Cleveland & Co	3,0613	512,614	499,526
Sandusky & Cin'ti ..	213,044	231,500	191,504
Marietta & Cin'ti ..	197,845	3-9 245	336,328
Sandusky & New	116,189	164,890	120,000
Five railroads	1,063,289	1,518,198	\$1,355,231

Neither of these roads are trunk lines, and all the through passengers are excluded. This table, therefore, shows what number of local passengers may certainly be relied upon in any part of the country where land and people are in the average condition. It is not calculated upon the density of population, but upon the number who must use that road or none; and therefore is applicable to any road where that can be exactly determined. The ratio of local passengers to population is 1.50 to 1. The average ratio of cash is 90 cents.

TABLE 6.—Through Passengers between Cincinnati and Atlantic Cities.

Routes.	No. Passengers	Receipts through to New York.
New York roads; Erie and Central	50,400	\$1,000,000
Pennsylvania	100,000	2,000,000
Baltimore	10,000	200,000
Four routes	160,000	\$3,200,000

NOTE.—It will be observed that this table is confined only to those who go the whole distance from Cincinnati to the Eastern cities; an average of 700 miles. It can be verified by an analysis of the Reports of Ohio Railroads made to the Commissioner of Railroads. It excludes the great numbers who cross Ohio to St. Louis, Chicago and other points without going through Cincinnati. The fact that the Pennsylvania road takes the great mass to Cincinnati is conclusive that the shortest line will take the through passengers. With 100 miles the shorter route to New York, the Great Eastern may confidently expect to take half the through passengers to the Atlantic.

TABLE 7.—Showing the Development of the Pennsylvania Coal Region from 1850 to 1870.

Time.	Population.	Coal carried by R. R.
In 1850	283,708	800,000 tons.
In 1870	530,547	6,200,000 tons.
Increase	246,839	5,400,000 tons.
Present result	600,000	6,000,000 tons.

This table is given to show the rapid and immense increase of the coal trade when there are means of transportation; and also to show the immense increase of railroad coal transportation. The development of the coal trade does not depend on the quantity in the natural coal

beds; but on the means of transportation. There are now no less than twenty-three railroads and branches in Pennsylvania engaged exclusively in the coal trade. No more remarkable development in industry has been exhibited anywhere in the world.

TABLE 8.—Results of Railroad Experience on Profits.

The following tabulative view of railroad increase I prepared and published in the *Railroad Record* without any reference to the Great Eastern. It shows the average increase of railroad business:

Year.	Tons
1858	18,000,000
1867	75,000,000
1870	100,000,000

We see, then, that since 1858, the tonnage of railroads has increased 450 per cent. But the number of miles of railroad increased but 150 per cent. We can not here go into the reasons of this, but the reader will easily understand, if he reflects, that the areas (and therefore the products carried) drained by a railroad increases at a much greater ratio than the increase in miles of road. For example, if a railroad was ten miles long, and the tonnage carried is represented by 100, then if the road is 100 miles long the tonnage carried will be represented by 10,000, because these are the squares or areas drained respectively by 10 and 100. This would make 100 fold; but we must recollect that this very fact makes competition, so that the road which now made 100 miles (instead of 10) soon encounters the competition of another road 30 miles off. But the principle holds good to an extent we see of increasing the tonnage 450 per cent., while the roads increased 150 per cent.

	In 1858.	In 1870.
New York	11,563,000	19,100,000
Six roads in Ohio	1,470,000	3,259,000

Aggregate	13,033,000	22,359,000
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In 12 years then, the number of passengers on about 5,000 miles of railroad increased 9-000,000, which is 75 per cent. That is, the number of passengers increased at the rate of 6 per cent. per annum.

The whole railroad experience of the country corresponds with this, and shows that any new line of railroad may expect to double its whole business in 12 years.

TABLE 9.—General Estimate of the Resources and Receipts of the Kentucky and Great Eastern Railway, Deduced from the Foregoing Tables.

Source of Revenue.	Amount.	Per Cent.	Receipts.
Local Passeng's. No.	533,976	90	\$535,576
Th'gh Passeng's "	100,000	\$15 00	1,500,000
Coal	250,000	2.00	500,000
Iron	200,000	3.00	600,000
Lumber	100,000	4.00	400,000
Agr'l Products "	200,000	3.00	600,000
Miscellaneous. "	100,000	5 00	500,000
Gen'l Merch'se "	200,000	4.00	800,000

Aggregate	\$5,435,576
Operating Expenses	3,510,000

Net profits of the road	\$1,925,576
Estimated cost 447 miles from Cincinnati to Frederick at \$35,000 per mile	\$15,645,000
Div. of 8 per cent. on that capital	1,251,160
Surplus for Sinking Fund	674,416

NOTE.—The number of passengers, agricultural products and iron are deduced directly

from Tables 1, 3, 4, 5, and 6. The estimate of coal (minimum) from table 7.

Of the general accuracy of the foregoing estimate, there are two tests derived from railroad experience which the reader can apply for himself:

1. The average receipts of all the railroads in the United States, (54,000 miles) is \$10,000 per mile. (See Poor's Manual of Railroads.) This for 447 miles to Frederick would be \$4,470,000. The above estimate gives for this road \$765,000 more than that. This is wholly in the receipts for through passengers, and when we consider that the road will be the shortest line from Cincinnati to New York by 100 miles, we must consider this as decidedly under estimated.

2. It has been proved by railroad experience (See Poor's Manual) that the ratio of the earnings from freights to the earnings from passengers is two and a third to one. Now we have determined almost exactly by railroad experience the amount of earnings from passengers, and have put in the table; it will be seen that the estimate for freights in the above table is only $1\frac{1}{3}$ to that of passengers; showing that by average railroad experience the estimate is too low. But that is because we have taken things as they now are and not as they will be when developed by the railroad itself. Herein we apply table No. 8, by which we see the number of passengers increase on railroads at the average rate of 6 per cent. per annum; and that the tonnage increases at a much faster rate; amounting in the whole profits of a road to more than 7 per cent. per annum. If the Great Eastern therefore was finished in 1873, in five years after the net profits of the road would be 35 per cent. greater or at least \$2,600,000 per annum, or 15 per cent. This has been the actual history of some of the great roads in this country. So far as statistics or the railroad experience of the country can determine anything, the Great Eastern offers the promise of being alike profitable to the region of country through which it passes and to those who shall own and conduct it.

Very Respectfully,

EDWARD D. MANSFIELD.

— The St. Gothard Railway, with a tunnel about the length of that of the Mont Cenis, will, says the London *Times*, very soon be commenced. The capital necessary for the tunnel is about 60,000,000f., and for the lines to join the Italian and the Swiss Railway about 125,000,000f. Subsidies to the extent of 85,000,000f. have been voted by Germany, Italy and Switzerland, and the remaining 100,000,000f. will be taken by a syndicate, 65,000,000f. in shares. It is estimated that at least seven to eight years will be required for the entire completion of the work.

— The total gold values of imports at New York, excluding foreign specie, from the 1st of January, 1871, to September 30th, 1871, amount to \$301,645,850, against \$239,631,857 for the corresponding period of the previous year; showing an increase in 1871 of \$62,013,933. The exports for the same period, including foreign goods re-exported, amount to \$171,763,682, against \$132,847,135 for the corresponding period of 1870; showing an increase in 1870 of \$38,916,547.

Eastern Kentucky Railway Company.

A few years ago, three or four Boston gentlemen, among whom was Mr. N. Thayer, associated a portion of their capital, and purchased a tract of land a few miles south of Greenupsburg, in Greenup county, Kentucky. They had reason to believe that there were large deposits of very superior coal lying in this body of land. The report of the State geologist said so; the citizens of that vicinity confirmed the report, and an examination by the agents of the purchasers warranted the faith which the new owners placed in it.

These gentlemen advanced capital for the development of the mineral wealth of their lands. They erected a furnace to make pig iron; they constructed a costly wharf from which coal could be shipped, and a railway that led from the river front into the coal and iron fields, and all the necessary structures, and sent from the East all the machinery and money that was deemed requisite to transact this business in the most profitable manner.

For a few months all went on well enough, and there was promise of a brisk traffic and large profits, when suddenly and unexpectedly the coal deposit was found to be a faulty one and was about to become exhausted. The geologist had been deceived by the promising outcrop, and by the surroundings which are always the associations of coal. This is one of those freaks in which Nature sometimes indulges—one of her spasms—occasionally found near the shore of a large river or lake—an evidence of the struggle she once had to settle her watery element into quiet beds, and her geologic stratas into regular and certain formations.

The question now very naturally arose among these enterprising gentlemen: "What further shall we do? All we have thus far invested," said they, "is profitless; to stop here is to lose a definite sum, to go on is to increase our risk, but at the same time to add to our chances of making the whole productive." The question was soon answered; with true American pluck and enterprise they concluded to go on. More money was put up to meet the emergencies, other lands beyond were purchased, where nature gave outward signs of less fickleness, the railway was pushed along over streams and through hills by expensive tunneling until it has reached a distance of thirty miles, property was purchased along the river front, new and more extensive buildings were erected in anticipation of the enlarged trade, stores were constructed and well filled, furnaces created and set at work, until the cost stood at upwards of two millions of dollars, and all contributed out of the private purses of the few gentlemen who had started the work, and afterwards resolved that it should succeed.

The result of this enterprising spirit is, that property in and about the pleasant village of Greenupsburg has increased largely in value;

many workmen have been profitably employed in that county who would otherwise have been idle or have left their homes for the West, or localities where business was active and money in circulation. Property and the products thereof along the line of the road have been largely benefited, capital has been invited into the country and expended in the construction and operation of other furnaces until there are now five in number, whose business is now tributary to this road; numerous coal mines have been opened, which are substantial and lucrative; large sums of money have been expended for timber and stone, which abound in this section of the country; and the railway, so unpromising in its early history, has become profitable, and the property of these worthy and enterprising gentlemen who inaugurated the scheme, and stuck to it through all its misfortunes and discouragements, is not only paying handsomely now, but is rapidly and permanently improving, with every prospect that its future will reach the productive point claimed for it by the most enthusiastic friends of the project.

There is one case (among many, we hope) where pluck and perseverance, directed by sound business sense, have been justly rewarded.

What the future of this work will be, it is not very difficult, we think, to foretell, when it is known that the Kentucky & Great Eastern Railway is to cross the southern terminus of this private interior road, and thus place it in direct connection with New York and all the important Atlantic cities, the coal and iron and timber consuming sections of the East, and also with the city of Cincinnati and all the business places of the West. Such opportunities will open markets for the wealth which abounds in North-eastern Kentucky, that are now foreign to it. They will call capital and enterprise and skill into that section of the country; its wonderful resources will become known, and a commerce will spring up which will command the entire capacity of the Railway Company, and ere long require largely increased facilities. With such connections, we shall expect to see constructed in Greenup county, within the next five years, one or two rolling mills, a nail factory or two, which shall use up most of the iron that will be made by a dozen furnaces. We anticipate an immense coal trade directly with New York and the principal cities of the East, and a general stimulus given to business in that part of the country which will add largely to the common wealth as well as promote individual fortunes.

We can not be mistaken in these predictions. The experience of the whole world justifies us in making them, and we feel confident that we are not over sanguine, nor even up to what the facts will demonstrate.

The Eastern Kentucky Railway Company have reason to be proud of their success. They have but to continue the economical and

intelligent management of the present Vice President, Mr. Bates, to insure the highest possibilities of their venture; and the people of that region have only to arouse to an activity and interest in public improvements, warranted by the great elements of wealth upon which they have so long slumbered to become among the most opulent in the country.

The Sale of the Louisville, Cincinnati & Lexington Railroad.

The railroad event of the past week was the purchase of the Louisville, Cincinnati & Lexington Railroad, which includes the Cincinnati & Louisville Short Line, to the Chesapeake & Ohio Railway Company.

This is an occurrence that was to be expected, and by the knowing ones in railroad affairs was predicted; the only trouble in the transaction being just how it should be managed so that the Chesapeake & Ohio company should get what they wanted and no more, viz., that part of the purchased road from Lexington to Louisville, and the Pennsylvania Central company obtain what they had assisted in building, and are supposed to control, to wit, that part of the road from the city of Cincinnati to Louisville, usually known as the Louisville Short Line.

The published terms of the purchase do not show how this matter is arranged between these two companies, but there is no doubt but that some plan is well understood between them, by which this division will be made. Indeed, we were told by a most responsible person connected with one of the great corporations, that whether the Chesapeake & Ohio company or the Pennsylvania Central purchased the road, the result would be the same, as the whole matter was well understood between them.

There are good reasons why this division should take place between these parties. That part of the Louisville & Lexington road extending from La Grange to Lexington can play no part in the scheme of the Pennsylvania Central organization, whereas it is absolutely necessary for the Chesapeake & Ohio, as by the stock interests she has in the Lexington & Big Sandy road, she is bound to see it constructed, and would be blocked at Lexington, or compelled to make a new road if she desires to reach Louisville at all. And, on the other hand, that part of the purchased road from Cincinnati to Louisville can not become any part of the Chesapeake & Ohio interest, as she will not probably want to reach Louisville by two lines running parallel with each other, nor when she can reach the city of Cincinnati from her proposed north-western route via Hillsboro. Thus both companies are served, and both bettered by the arrangement.

The terms of the sale are substantially as follows:

The Louisville, Cincinnati & Lexington company are to issue one million of dollars of stock, which the Chesapeake & Ohio company purchase at fifty cents on the dollar, and in addition thereto they agree to purchase all the stock of the road that may be offered within sixty days at sixty cents on the dollar cash, or if sold upon time the price to be sixty-five cents; the Louisville, Cincinnati & Lexington company guaranteeing that at these rates a sufficient amount of such stock will be offered as to give the purchasers the control of the purchased road at the next election. It is understood that \$300,000 are required to bring about this result, and also that such stockholders as do not desire to sell at these rates stand as they did before; and the present managers are to keep control of the road until the election in September, 1872.

In the published proceedings of this transaction it does not appear how the contract with the Keystone Bridge Company for the sum of \$75,000 per annum for the use of the bridge across the Ohio river from Newport to Cincinnati, is to be arranged. These matters will undoubtedly be worked up in the transfer of the Short Line to the Pennsylvania Central company.

On the whole, we think the arrangement a good one for all the interests concerned. We have no doubt of a perfect understanding, and we are glad it has been amicably adjusted between the great contracting parties.

Out of the Ashes.

We were afraid that our valuable exchanges in Chicago, the *Gazette* and the *Review*, were swept away, for a time at least, by the great fire, but they are on our table, as usual, brimful of news and original matter; changed a little in appearance, but equally attractive as the old faces that won their way into public favor.

The promptness with which the proprietors of these journals have met the wants and quieted the fears of their patrons and friends, is one of the best evidences we have seen of the energy and spirit that made Chicago what she was, and that will in a short time resurrect and make her greater, grander and more powerful than ever.

The railroad men of the country ought to show their appreciation of the efforts of the proprietors of these journals, not by mere expressions of sympathy, but by sending on the names of new subscribers, accompanied with the money for one or two years' subscription. A little work in this direction would do lots of good, not only in cheering up these brave men, but in enabling them to supply the railroad interests of the country with what they really require for their own prosperity, viz., the *Chicago Railroad Gazette*, and the *Chicago Railway Review*.

Ceredo Mineral Railway.

We had the pleasure of meeting the directors of this company, a few days ago, in the pleasant village of Ceredo, two miles east of Catlettsburg. We found them gentlemen of wealth and character, who have secured large landed and mineral interests up the Big Sandy river, and are now engaged in the construction of a narrow gauge (3 ft. 3 in.) railroad from Ceredo, upon the Ohio river through these possessions. It is their intention to extend this road into the interior for about one hundred miles, by which they penetrate that famous belt of coal, iron and timber, that extends from the Monongahela country through the State of Kentucky, and that reach their highest perfection within the drainage of the Big Sandy and Licking rivers.

This company have made all the arrangements for the completion of their road, and the principal persons concerned in it were upon the ground for the purpose of directing the survey, that commenced the day we were at Ceredo, and to facilitate the work in every way they can.

The value of such a work must rank very high. It will be cheap, with practicable grades, a capacity to do an enormous business, and supplying a country whose industrial resources are not only varied, but so extensive as to warrant the assertion that they are inexhaustible.

The wealth of the Big Sandy has long been known, and we have heard considerable talk at one time and another about bringing it out into the world and converting it into money, but this, we believe, is the initiatory movement, and we are fully convinced that it will be productive to a high degree, and we most heartily hope up the merits of the gentlemen who are so vigorously moving it.

As soon as the surveys are completed, we hope to place before our readers other facts of interest touching this project, and the country through which it is proposed to pass.

— The track of the Baltimore & Potomac road is now laid to within about 8 miles of Washington, some 13 or 14 miles south of the Annapolis & Elkridge Railroad. With the line laid north of this road there are now about 22 miles of the rails of the Potomac road laid. The two abutments of the bridge over the Patapsco are now finished, and the builders are now at work upon the middle piers, which, it is expected, will be finished about the 1st of December. The excavation under the Baltimore & Ohio Railroad, near the Relay, is almost through.

— The Zanesville *Signal* says: "Hon. Hugh J. Jewett has been elected one of the directors of the Pennsylvania Railroad Company, and is to have the management of all the company's connecting lines west of Pittsburgh." This announcement would imply a change of rulers, if not of policy, for if Mr. Jewett goes in, Mr. McCullough will publicly come out from the general managership of the Pennsylvania company.

The Pennsylvania Railroad's Lease of the New Jersey Railroads.

The common idea is that the Pennsylvania Railroad has obtained control of the two lines of railroad between Philadelphia and Jersey City and between Camden and Amboy, and of the Delaware & Raritan Canal, and that that is the extent of the acquisition. But the truth is that these roads constitute less than one-third of the whole amount of roads which passes into the hands of the lessees. These roads comprise one hundred and fifty-four miles of track, while the whole amount of road transferred is four hundred and ninety-eight miles, besides sixty-five miles of canal, two ferry companies and one bridge company. The following is a list of the separate charters that pass under the lease to the Pennsylvania Railroad Company:

	Miles.
Camden & Amboy Railroad	94
Philadelphia & Trenton Railroad	28
New Jersey Railroad & Transportation Co.	32
New Jersey Railroad	37
Salem Railroad	17
Millville & Glassboro Railroad	22
Cape May & Millville Railroad.....	41
Swedesboro Railroad.....	11
Belvidere Delaware Railroad.....	68
Flemington Railroad	12
Camden & Burlington Railroad ..	25
Pembertown & Hightstown Railroad.....	25
Mount Holly & Medford Railroad.....	6
Burlington & Mount Holly Railroad.....	7
Vincetown Branch Railroad.....	3
Freehold & Jamesburg Railroad	15
Squankum & Freehold Railroad.....	4
Rocky Hill Railroad	7
Perth Amboy & Woolbridge Railroad.....	7
New Brunswick & Millstone Railroad	7
Somerset & Mercer Railroad.....	18
Frankfort & Holmesburg Railroad.....	4
Connecting Railroad	8

Total miles.....498
 Delaware & Raritan Canal & feeder, 65 miles.
 Jersey City Ferry Company.
 Camden & Philadelphia Ferry Company.
 Delaware Bridge Company.

This table serves to convey some idea of the addition that has been made to the details of the tremendous business controlled by the Pennsylvania Railroad. Each of the above charters involves a separate organization, each requiring constant oversight and constant development to enable the lessee to fulfill the obligations of the lease, and, at the same time, to keep up with the steadily increasing necessity for larger and better accommodations for freight and travel. And yet this addition of five hundred miles more of railroad will not be felt as an influence disturbing in the slightest degree the smooth and quiet working of the machinery of the Pennsylvania Railroad Company.—*Phila. Bulletin.*

— The stock of the Lake Shore & Tuscarawas company is fully subscribed, and a contract has been made for the entire construction of the railway, including road bed, superstructure, water tanks, turn tables, buildings, etc., and rolling stock to the amount of \$2,000 per mile, from Elyria to the intersection with the Panhandle road, a distance of 92 miles. The contract price was \$3,350,000, of which \$350,000 are payable in cash, and \$3,000,000 in the securities, stock and bonds of the company. The road is to be completed to Massillon by July 1st, 1872, and to its southern terminus within two years. The cost per mile, under the contract, will be \$34,413.

Railroad Earnings for September, and from January 1 to October 1.

The returns of western railroad traffic have more than the usual interest this month, in consequence of the extreme depression in stocks which has followed the Chicago fire. It is fortunate, therefore, that the earnings are generally favorable, and compare well with the same month of 1870, indeed, taking the whole list together, September shows a more uniform increase in earnings than any previous month of the year, and several roads which had showed a decline compared with 1870, on nearly every month since January, now show an improvement. In regard to the Ohio & Mississippi road, and the Marietta & Cincinnati, their earnings will be observed with much interest in the present and following months in consequence of the advantage expected to accrue from the change in gauge on the Ohio & Mississippi; but, as we have previously observed, the full extent of this advantage may not appear in the gross earnings, but should also be considerable in a saving of expenses. It will be noticed that the Kansas Pacific road now appears in our tables for the first time this year, and the Lake Shore & Michigan Southern have also issued a statement of their earnings for September and since January, 1871. The traffic of the several roads having termini in Chicago will be observed with much interest during the next few months, as it is uncertain to what extent they will be affected by the interruption to business caused by the fires.

RAILROAD EARNINGS IN SEPTEMBER.

	1871.	1870.	Increase
Chicago & Alton.....	\$505,904	\$397,519	\$98,385
Central Pacific.....	1,033,800	767,183	246,617
C. & W., Col., Cin. & Ind.....	374,671	317,867	56,804
Illinois Central.....	825,845	991,235	*165,390
Kansas Pacific.....	368,338	323,404	44,934
Lake Shore & Mich. South.....	1,369,594	1,375,587	5,993
Marietta & Cincinnati.....	165,191	132,998	32,193
Milwaukee & St. Paul	815,345	608,319	207,026
Ohio & Mississippi.....	335,379	314,667	20,712
Pacific of Missouri.....	364,128	337,649	26,479
St. Louis & Iron Mountain.....	141,165	124,125	17,040
Toledo, Wabash & Western.....	578,816	508,042	70,774
Union Pacific.....	736,180	728,625	7,555

Total.....\$7,635,346 \$7,061,341 \$574,005
 Net increase, 1871.....573,915
 *Decrease.

For the nine months of 1871 now passed, the earnings on nearly every road included in our list below show a material improvement, and with the large crops at the West and the considerable increase which will probably take place in the transportation of goods to Chicago, it is probable that the remaining months of the year will also compare favorably with the last quarter of 1870. The interruption of business in Chicago during the autumn months will probably increase the grain and forwarding business in some of the other leading western cities, and the railroads terminating in those cities will involuntarily profit by the disasters of Chicago.

EARNINGS FROM JANUARY 1 TO OCTOBER 1.

	1871.	1870.	Increase.
Chicago & Alton.....	\$3,953,514	\$3,538,339	\$415,175
Central Pacific.....	6,932,552	5,803,461	1,129,091
C. & W., Col., Cin. & Ind.....	2,768,222	2,315,241	452,981
Illinois Central.....	6,269,901	6,271,269	*1,368
Jarrietta & Cincinnati.....	1,172,889	979,939	192,950
Milwaukee & St. Paul	4,31,624	5,191,975	*880,351
Ohio & Mississippi.....	2,269,511	2,266,423	3,088
Pacific of Missouri.....	2,607,410	2,565,000	42,410
St. Louis & Iron Mountain.....	1,113,937	977,769	136,167
Toledo, Wabash & Wes.....	4,089,043	3,152,058	936,985
Union Pacific.....	5,434,815	5,838,549	*393,734

Total.....\$41,396,227 \$38,919,008 \$2,477,219
 Net increase, 1871.....2,479,219
 *Decrease.

—*Fin. Chronicle.*

Journal of Railroad Law.

RECENT DECISIONS.

Common Carriers.—Checking Baggage; Duty of Carrier as to Baggage; Connecting Lines of Railway; Negligence.—The plaintiff purchased a ticket at a station on defendant's road for New York, and checked his baggage for that place. The defendant's road extended only a portion of the route to New York, but passengers and baggage were transported by a connecting road. On plaintiff's arrival at his destination he did not at once call for his trunk, but left it until the second day, when, on demanding it, it was discovered to be lost. *Held*, that the fair construction was that the defendants agreed, for a consideration, to transport plaintiff and his trunk to New York, and deliver the latter to him on his arrival, if called for; if not, that it should be properly stored, and reasonable care exercised to prevent injury or loss until it was called for.—[Burnell vs. N. Y. C. & R. R.]

The connecting railroad company being the agents of the defendants in performing the contract, and the contract of storage being part of the original contract of carriage, it follows that the defendants are liable if any one is.—[Ibid.]

The failure of the connecting company to produce the subject of bailment when demanded, *primo facie* established negligence and want of due care. When there is a total default to deliver the goods bailed, on demand, the onus of account lies with the bailee.—[Ibid.]

To show that the bailee is generally careful does not establish as a question of law that he was not careless as to the particular article.—[Ibid.]

Liability for neglect in forwarding goods.—The plaintiff, having a lot of wool which he had contracted to sell at a certain price, delivered in B., called upon the agent of defendants, common carriers, and told him that he wished to send it to C., immediately, and that it was sold if it could be forwarded at once. The agent told him that it should go without fail. The plaintiff delivered it accordingly, but the defendants neglected to forward it for several weeks, during which time it depreciated in value, and on its arrival in B., the purchaser declined to receive it, on account of this delay, and the plaintiff was compelled to sell it at a diminished price: *Held*, that plaintiff could recover damages for the depreciation in its market value, and also for the loss of his chance to sell.—[Deming vs. Grand Trunk Railway Co. (N. H.) 267.]

Common Carriers.—Liability for baggage received for transportation.—The plaintiff was a passenger on defendants' road, but had lost her trunk while traveling over a connecting road. A few days after, a conductor on a connecting road found the trunk, and left it in charge of the defendants' baggage master, stating the facts, and requesting him to forward it to plaintiff, which he agreed to do. Nothing was said about freight, nor whether the trunk should go by the freight or passenger train. The trunk being lost, *held*, that the defendants were liable for its value.—[Wilson vs. Grand Trunk Railway (Me.), 26.]

Common Carriers.—Duty to carry all freight without preference.—The defendants contracted with the Eastern Express Company to give the latter a certain share in the baggage and mail car attached to passenger trains, for the carriage of their goods, and agreed not to let any similar space in any car attached to pas-

senger trains to any other person or express carriers during the continuance of the contract. Plaintiffs, another express company, offered packages to be transported on defendants' passenger trains, which the defendants refused to receive or transport: *Held*, that defendants were liable to plaintiff for such refusal.—[N. E. Express Co. vs. Maine Central R. R. Co. (Me.) 31.]

Negligence in crossing railway track.—It is the clear duty of a traveler upon the highway, in approaching a railroad crossing, to use all proper precautions to avoid injury, and the least he can do is to look in both directions from which trains may approach.—[Gorton vs. Erie Railway Co., N. Y. Court of Appeals, June, 1871.]

And where the traveler neglects to so look, the railway company will not be liable for the injury done him by a passing train; although those managing the train are negligent in not giving the required signals, or any signal, when approaching the crossing.—[*Ibid*.]

Negligence.—Of contributory negligence.—In an action against a railroad company to recover damages for the death of a person, caused by the alleged negligence of the company, while the deceased was engaged in unloading a coal car, it was deemed the central question whether the deceased used proper care and caution in entering upon the car under the circumstances then existing, the company's employees being at the time engaged in switching upon the track where the car was standing, in making up a train; for however discreet and careful the deceased may have been when on the car, the question remained, and to be submitted to the jury, was he justified in being there at the time and under the circumstances?—[I. C. R. R. vs. Weldon.]

Right to demand extra fare when paid in cars.—By the regulation of defendants, a railroad company, persons taking passage in their cars, at a place where a ticket office was established, without first procuring a ticket, were charged ten cents extra in addition to the regular fare. The plaintiff finding the ticket office closed, entered the cars without a ticket, intending to go to M.; made known to the conductor his destination, and gave him fifty cents, which was the regular fare; the conductor demanded the additional ten cents, which was refused, and the plaintiff was expelled at J., the car fare to which was fifty cents: *Held*, in an action for damages: 1st, that the conductor, having accepted and retained the fifty cents, could not afterwards eject the plaintiff; 2d, that evidence was inadmissible to show the car fare to J.; and 3d, that the company, in order to enforce said regulations, were bound to keep their ticket office open a reasonable time in advance of the departure of trains, to enable passengers to procure their tickets.—[Du Laurens vs. The First Division of the St. Paul & Pacific R. R. Co. (Minn.) 102.]

Liability of railroads for injuries to persons improperly upon their track.—A railroad company whose train is approaching a man walking lengthwise upon their track, which rings its bell and sounds its whistle in time to enable him to get off, is not liable for an injury which happens to him under such circumstances.—[Mary Finlayson, adm'x, vs. The C., B. & Q. R. R., U. S. Circuit Court, District of Iowa.]

Liability of railroads as warehousemen for baggage of passengers.—When a passenger upon a railroad purchases his ticket, and checks his baggage to the place of his destination, and such baggage arrived at its destination,

and is not, from any cause, delivered to such passenger, or to his agent, it was *Held*, that it was the duty of the company to deposit such baggage in their baggage room, in which event their responsibility becomes that of warehousemen, and they must respond in damages for any neglect in that capacity.—[C. R. I. & P. R. R. Co. vs. Fairclough, Southern Circuit, Illinois.]

It is not necessary that such a place of deposit should be absolutely fire proof, or burglar proof, but such a place as a man of ordinary prudence would use for the storage of his own goods.—[*Ibid*.]

Liability of railroad companies for injury to their servants occasioned by dangerous structures.—In an action against a railroad company for injuries sustained by the plaintiff while in the service of the company as a brakeman, the evidence showed that the injury complained of happened while plaintiff was engaged in the discharge of his duties, by collision with a projecting awning from one of the station houses on defendants' line of road, whereby he was knocked off the car and so injured as to require amputation of his left arm; and that the dangerous position of this awning was well known to the division superintendent and division engineer, whose attention had been called to it a long time prior to the accident: *Held*, that this was negligence of such a character that the company must be held liable for the damages sustained.—[Ill. Central R. R. Co. vs. Welch.]

As said by this court in the case of the C. & N. W. R. R. Co. vs. Swett, 45 Ill. 201, railroad companies are bound to furnish their servants with safe materials and structures, and must, in the first instance, construct their road with all the necessary appurtenances. And they must be kept in necessary repair; and a person entering the service of a railroad company, has a right to presume that in these respects it has discharged its obligations.

A person, engaging in the service, assumes the ordinary perils of railroad life; and also special dangers arising from the peculiar condition of the road, so far as he is aware of their existence, and his exposure to them would be his voluntary act.

But in this case, the danger was of such a character as well might escape the observation of a person who had not been in the employ of the defendants for a long period of time; and there is no reason for supposing that the plaintiff had acquired knowledge of the unsafe condition of this awning before his injury, as he had been but two months upon the road, and except upon two trips had always passed this station in the night.—[*Ibid*.]

At a term of the United States District Court held at Lowell, Massachusetts, it has been decided that under the second section of the bankrupt act, railroad contractors can not be regarded as merchants or traders by any fair and reasonable construction of those words, and that hence the dishonor of their commercial paper does not constitute bankruptcy.

For the above reports we are largely indebted to the Western Jurist, Albany Journal, Law Register, &c.

—The entire customs receipts for September will overrun \$20,000,000, which is the largest ever known. The internal receipts for the same month are \$10,632,615, against \$12,001,903 for September, 1870. The receipts for the quarter ending on September, 1871 are \$36,000,000 against \$51,750,000 for the same quarter in 1870.

SUCCESS OF NARROW GAUGE.—Volumes have been written, in the newspapers—and not a little in the railway press, with exception of the *Review*—to prove that a narrow gauge railway can not succeed. We have preferred to await the practical test, and to be wise after, rather than owlish before the fact.—Noting the opening of the Toronto, Grey & Bruce Railroad (3½ feet gauge) to Orangeville, the *Advertiser* of that place says:

"We are glad to see the large business which is being done on the railroad since it opened here. The amount of goods which it has brought is truly surprising. The number of passengers traveling both ways is also very large. The fact is the road is a great success. Having gone to Toronto and back on the line the present week, we were agreeably surprised at the comfort of the journey. We have heard a good deal of the 'narrow gouge,' and the 'wheelbarrow railroad,' but let anybody get into the cars without being told anything about narrow gauges, and we will venture to say that he would not observe the difference between it and any other railway. The cars are seated in the same way as the wide gauge, each seat accommodating two comfortably. The track, too, is very smooth.—*Review*."

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Financial Condition and Prospects of the Country.

In discussing the various railroad enterprises, their prospects and results, one of the principle elements in any safe calculation is the financial condition of the country. If there were not merely a "scarcity of money," as it is commonly called, but a scarcity of what is of much more importance, of available assets, personal property, which is available in the market for cash, then the great railroad enterprises of the day could not be well carried on. But the very reverse is the fact. Not only is there double as much money as there was twenty years ago, but there is five times as much of stocks, bonds, and of available personal property as there was then. What is the consequence? Why, there is five times as much capital as there was then to be invested in railroads, telegraphs, gas works, water works, steamship lines, or any thing which may be set up as an object of enterprise. The whole mass of Government bonds, State stocks, railroad stocks, bank stocks, etc., are now available for other enterprises. Every day, on the stock exchanges, millions of dollars in stocks are sold for money. But one of the most marked evidences of the change which has gone on, is the advertisements of some of the great New York brokers. They come out showing that Government bonds may be converted at a high premium into railroad bonds below par. This is very evident, and as the United States bonds are always salable, there is constantly a reservoir of capital for new enterprises, which may be

available at any moment, and which did not exist a few years since. Here, for example, is one mode in which a New York banker invites bondholders to invest. Take the following sum in arithmetic:

\$1,000 sold for.....	\$1,140 00
Invested in railroad bonds at 90.....	1,240 00
6 per cent. interest on U. S. bonds, with premium at 12.....	67 20
7 per cent. interest on \$1,240 R. R. Bond.....	86 80

This is an increase of 28 per cent. on the income. Good railroad bonds are safe, and this is the mode in which large amounts in new investments are made. But no doubt a much larger amount is invested from the actual income of the holders of stocks. It is not until we look into the matter closely, that we can realize full the enormous change which has gone over the country in the past ten or twelve years. There were then about two hundred millions of dollars in bank stocks, about as much in State stocks, a hundred millions or more in manufacturing or miscellaneous stocks, and a thousand millions in railroad stocks, and a little in the U. S. Governments. In round numbers the following statement will embrace full all and perhaps more than all the available stocks held in the United States in 1860, viz:

State stocks.....	\$100,000,000
Bank stocks.....	200,000,000
Railroad stocks and bonds.....	1,000,000,000
U. S. Governments.....	50,000,000
Total.....	\$1,450,000,000

The following table will show very nearly the amount of stocks held in this country in 1871:

State stocks.....	\$100,000,000
Bank stocks.....	300,000,000
Railroad stocks and bonds.....	1,500,000,000
Manufacturing and miscellan's.....	200,000,000
U. S. Governments.....	1,000,000,000
Total.....	\$3,100,000,000

Here is an increase of available stocks in 11 years of \$1,650,000,000; or more than double. As the issues of all these stocks are known, there can not be much error in this statement. We have allowed for \$100,000,000 of State stocks and \$1,200,000,000 of U. S. Government stocks being held abroad. This is more than half, and we think fully up to the fact. If the owners chose to re-invest in other enterprises, they can have the money in the market, and probably some of the stocks would go to Europe. But the great mass of new investments are made from the incomes of wealthy people. Very few of people not rich own these stocks. Hence, we shall not exaggerate when we say that full two-thirds of all income from stocks is re-invested. Let us see what that is. In estimating the income from railroads, we take the "Nett Earnings," as stated in Poor's Manual, no matter if it be part in the same roads. In any case it will be represented by new stock. Then the income stands thus:

State stocks.....	\$6,000,000
Bank stocks.....	30,000,000
Railroad stocks and bonds.....	175,000,000
Manufacturing and miscellaneous.....	25,000,000
U. S. Governments.....	60,000,000
Total.....	\$296,000,000

We believe this statement to be much below the truth; for it omits several classes of commercial stocks, such as that of insurance companies and private bankers. But it serves to show in what manner active, available capital has increased in this country. Supposing the above table to be nearly correct, there is at least \$250,000,000 of income in this country available for re-investment. No doubt a portion of this goes into fixed investments, such as houses, public buildings, &c. But, on the whole, there will be next year over two hundred millions of dollars to be re-invested in either railroads or manufactures. This is *fourfold* what there was ten years ago.

Let us now look to some of the results of this great fact, on the new enterprises of the day. In the first place, the direct effect of this increase of available capital is to *cheapen money*; and notwithstanding the great variation in the interest of money, and sometimes apparently rising, there is no doubt that the average interest in the civilized world is gradually being reduced. The next effect, undoubtedly, is to furnish more capital and facilities for railroads, manufactures or other good enterprises. No doubt there may, at times, be commercial convulsions, which will suddenly tighten the money markets, and restrain capital. But, taken as a whole, there will be, for yet some years, abundance of capital for all reasonable enterprises.

Atlantic & Great Western Railroad.

In its early inception this great route of traffic was the victim of circumstances beyond the control of owners; built three thousand miles away from its financial base, much had to be entrusted to agents. At so great a distance, and in a "big thing" it is not always possible to secure the right man in the right place. Although this was but measurably true, with regard to the early history of the Atlantic & Great Western Railway, yet there were other causes that were infinitely more potent in securing the financial embarrassments that resulted to it. We need but mention the wonderful feats at ledgerdom and stockbubbling practiced by Sir Morton Peto and associates. Another serious difficulty has been, and ever will be until remedied, that it has not the control of its own traffic, as the road has neither beginning nor end. But we did not intend to discuss the history of the road, nor to comment on the misfortunes of its geographical position. These are matters to which we only refer incidentally. Our purpose was to speak of the course pursued by the Trustees in making the various appointments to promi-

ment and important positions in the management. We have already on other occasions alluded to two or three of these appointments as being the very best that could be made. The last selection is that of Gen. GEO. B. WRIGHT, the late Railroad Commissioner of Ohio, as the Vice President, and active manager of the road. That this was a judicious selection, time and results will best show. For integrity and oneness of purpose in furthering the interests of the company, certainly no more judicious selection could have been made. That Gen. WRIGHT understands the theory of railroad construction and management, his reports as Railroad Commissioner, from the inception of the commission up to the present time, fully demonstrate. Indeed, we attribute to his valuable services in this position, more than to anything else, the superior condition and organization of the railroads of Ohio over those of nearly every other State of the Union. If the economic views and thorough systematic management of Gen. Wright is seconded by the future directory of this great enterprise, as we have no doubt it will be, we think the stockholders need have no fears of the result, and rest with implicit confidence on not only his integrity but ability to get out of the road the most satisfactory results attainable.

Cachis.

[From the Arizona Miner.]

If the following from the Las Cruces *Borderer* is true, then the last act of the drama of infamy, in which Colyer has figured so conspicuously, is complete:

"We have no doubt from the manner in which the information reaches us, that this blood-thirsty Apache has come into the reservation at Canada Alamoso. Whether he accepts the situation and is willing to be reconstructed, or whether it is for the purpose of keeping out of the clutches of General Crook for a season, we have not learned. Take him to Washington and lionize him by all means."

We fully appreciate the feelings of the editor of the Arizona *Miner*, and concur in all that he could say about Cachis. Cachis is the finest looking, the best physique, and the ablest strategist of the whole Apache nation. He commands more influence, and has been guilty of, and is responsible for, more devilment, than all the balance combined. If we owed him but for one we might be expected to forgive, as much as Vincent Colyer might ask us to do, but he has sinned against us as an individual more than "seventy times seven," and we can not, neither will we forgive. We pledge the editor of the *Miner* and the people of Arizona, that should he ever visit Washington, that we will have him arrested and tried for murder, first of our brother William Wrightson, then Hopkins, Grosvenor, Jack Lea Poston, and a host of others, whose names we can mention. If he reaches Washington, it is very doubtful if he ever sees Arizona again, unless he passes through it on his way to that hunting ground where all such brutes should be, and where he would "cease from troubling" and his bones be mixed with "the rest."

Brother Marion, we give you "our hand on that."

Indianapolis, Cincinnati & Lafayette Railroad.

ANNUAL MEETING OF THE STOCKHOLDERS AT INDIANAPOLIS.

J. A. Pomeroy, of Cincinnati, was called to the chair, and A. Worth, of Indianapolis, secretary.

Minutes of preceding meeting read and approved.

The chair announced that the election for nine directors was in order, and that those not interested should withdraw.

Election was had by ballot.

REPORT OF THE RECEIVERS.

Before the result of the balloting was announced, Mr. Ingalls was called upon for the report of the Receivers, which he presented and read, as follows:

"To the Stockholders of the Indianapolis, Cincinnati & Lafayette Railroad Company:

"Your road during the past year has been in the hands of the undersigned, as officers of the court, and it is proper that we should give you some statement of what it has earned and how its income has been spent.

"When the company and its affairs were put into the control of the court, on the 26th of October, 1870, it was operating its own line and also what was known as the Cincinnati & Martinsville Railroad and the Whitewater Valley Railroads.

"We continued to operate the Whitewater Valley Railroads until May 1, 1871, when they went into the hands of the Whitewater Valley Railroad Company. By the terms of settlement we obtained the release to the Indianapolis, Cincinnati & Lafayette company of \$85,000 due their company for past rent, and also made an arrangement by which we utilized and made a source of future income, \$27,000 of Harrison Branch stocks, and \$50,000 of Hagerstown certificates. We also made a running arrangement with those roads, which thus far has worked satisfactorily to both parties.

"We have operated and are still operating the Cincinnati & Martinsville Railroad. It will be seen that its earnings are small, but during the last six months they have steadily increased. We have spent and are still spending money in improving its track, &c.

"This division has been under the management of Gen. John C. McQueston, a careful and faithful officer.

"From the 26th of October, 1870, to the 1st of November, 1871, our receipts and expenditures have been as follows:

Earnings from Oct. 26, '70, to Nov. 1, '71, main line...	\$1,636,138 06
Earnings from Oct. 26, '70, to May 1, '71, W. W. Valley	93,457 65
Earnings from Oct. 26, '70, to Nov. 1, '71, Martinsville.	31,564 64
Net income from C. & I. rents	16,663 61
Total of all sources	\$1,827,823 96
Total operating expenses from Oct. 26, '70, to Nov. 1, '71 (including taxes and \$110,000 spent in extraordinary repairs and renewals	\$1,205,510 53
Bond interest accruing per annum...	553,040 00
Total expenses	\$1,763,550 53

Net earnings after paying operating expenses, taxes and bond interest \$64,273 43

"Of the \$558,040 bond interest mentioned above, \$223,020 remains unpaid, a portion of the receipts having been used in payment of debts on account of old company, which are as follows, viz:

Taxes.....	\$26,681 95
Rents	23,567 91
Sundry debts, due employees, &c.	103,228 32
Am. Merch Union Express Co...	27,550 36
Appropriated to B. & O. R. R. by M. & C. R. R., on account of rents	45,000 00

Total.....\$226,028 54
Add bond interest paid and chargeable to old company..... 26,562 50

Total payments on account old company.....\$252,591 04

"It will be seen that our operating expenses have been large, but this is due in a measure to the condition in which we found the road and equipment.

"For two years previous to the Receivership the financial condition was such that nothing was done that could by any possibility be avoided. Consequently the iron and rolling stock were very much dilapidated.

Accompanying this report will be found reports in detail from our Master Mechanist and Master of Road and Engineers.

"By them it will be seen that we have thoroughly overhauled nearly every engine on the road, that a large number of freight cars have received extensive repairs, that the whole passenger equipment has been kept in first class order. In addition to repairs and rebuilding, we have built one new first class passenger coach, two new baggage and mail cars and sixteen coal cars.

"We have added new equipment worth at least \$25,000, and we have spent over \$30,000 over and above what would be needed for ordinary repairs and renewals if the rolling stock had been in good order.

"We have bought, under the direction of the Court, three new freight locomotives, to be delivered this month.

"With these, and the expenditure of \$50,000 during the next year upon our locomotives and cars, over and above what will be required for ordinary repairs and renewals, the equipment will be in first class order.

"In the road department, extensive repairs and improvements have been made.

"On the 179 miles of road from Cincinnati to Lafayette 2,510 tons of iron have been laid and 82,500 ties.

"One new bridge has been built to replace one burned, and two have been built in place of old ones.

"A large sum of money has been spent upon water stations and depots in renewing and improving them.

"Nearly a mile of new sidings have been laid, at an expense of over \$5,000.

"At least \$50,000 has been spent in this department over and above what would have been required for renewals and ordinary repairs if the road had been in good order when we took it. It will require next year for new rails and bridges about \$50,000 over and above the ordinary repairs, to place the road, stations and bridges in first class order.

"Our relations with connecting roads are all friendly. The business of the road is steadily increasing.

"Our trains are running with great regularity, and without accident.

"The employees of the road, as a class, are far above the average, and are working diligently and faithfully for its interests.

"It will be seen that the income of the road from rents from real estate the past year has been something over \$16,000.

"During the year we have leased various portions of the real estate of the company unoccupied, at such rates that the income from this source next year will be over \$60,000, and there will be a saving besides, in taxes which the lessees pay, of about \$10,000, making a gain to the company of over \$50,000 over last year; and also a reduction in depot expenses and repairs, by admitting other roads to their use. If the contract with the Ohio & Mississippi Railroad, which has been partially made, should be ratified, it will increase this sum \$15,000 per annum.

"The Cincinnati & Springfield Railroad Company (an extension of the Cleveland, Lake Shore & New York Central line), is building a road into Cincinnati, and have leased a portion of our grounds and depot. This will undoubtedly give a large increase of business. At Lafayette, the other end of the road, the Lafayette & Bloomington and the Cincinnati, Lafayette & Chicago Railroads, are about completing their roads, and they also rent our grounds and depots. These are very valuable connections with Chicago and the West. We have been able to prevent the sacrifice of any of the collaterals of the company thus far, and all the secured creditors are charging a moderate rate of interest, not exceeding eight per cent. in any case, and in nearly all seven.

"We owe no debts as Receivers, except for current expenses of the month just ended, a large portion of which has been paid or the money drawn for.

"The financial condition of the company, as near as we have been able to get at it, is as follows:

Bonded debt authorized.....	\$8,400,000
Bonds actually sold (most of the balance being out as collateral)	7,972,000
Coupons unpaid (about).....	400,000
Debts secured by bonds, real estate, &c.....	450,000
Preferred debts	50,000
Claims in litigation.....	50,000
Unsecured debt (about).....	740,000
Indianapolis, Cincinnati & Lafayette stock	5,685,490
Cincinnati & Indiana stock outstanding actually sold.....	43,000

"The agreement for reorganization having been signed by more than two thirds of the holders of unsecured debts and of the bonds of 1869, we hope the legal complications of the company will be speedily settled, and the property placed in your hands.

"From the business of the past year and the prospects of the future, in our judgment the property can earn interest upon all its bonded debt, and leave a surplus sufficient in a few years to pay off all its floating debts. You will then have a very valuable property in the stock.

T. A. MORRIS,

M. E. INGALLS,

"CINCINNATI, Nov. 4, 1871. Receivers."

On motion of Mr. Broadwell, the report was received, and the course of the Receivers approved.

Judge Hoadly suggested that the plan of reorganization be read for information. He afterwards moved the following, which was adopted unanimously:

Resolved, That the stockholders of the Indianapolis, Cincinnati & Lafayette Railroad Company approve the plan of reorganization signed by more than two-thirds of the holders of the bonds of 1869 and floating debt creditors of the company, and hereby authorize the Board of Directors to file in the name of the company a voluntary petition in bankruptcy, or to submit to an adjudication of bankruptcy now pending upon the petition of Joel F. Richardson and others, and upon any other petition that has been or may be filed, or to consent to a sale under proceedings for foreclosure as said board may deem best, and in case of a sale of the whole or any part of the property or franchise of said company, under any of said proceedings or otherwise, the stockholders hereby authorize the said board to convey such property and franchises so sold to the purchaser, by way of further assurance, or otherwise, as said board may deem best.

The judges of election reported the following as duly elected to serve as directors for one year: Geo. H. Chapman, Indianapolis; Augustus S. Winslow, S. G. Broadwell, J. A. Bates, Joseph C. Butler, Cincinnati; William H. Booth, George Bliss, John S. Kennedy, New York; Thomas H. Perkins, Boston.

The whole number of shares is 113,667, of which 63,526 were represented in the election.

Immediately after the meeting of stockholders, the directors met for organization, with the following result: Wm. A. Booth, President; A. S. Winslow, Vice President; Chas. H. Booth, New York, Secretary.

Seasoning Timber.

All seem to agree that timber or lumber dried by steam is not so good as the weather seasoned stuff. The loss is in elasticity and strength, and consequently also in durability. But steam dried wood does not absorb any more moisture than weather dried; in either case the absorption is from five to ten per cent. All bending should be done just as it comes from the steam box, while the wood is yet in a hot, damp state, and never after. Indeed, all wood intended for bending purposes should never be allowed to dry before bending. No cooper will buy dry hoop-holes, because they have lost their elasticity and toughness. It is true we have once seen dry veneers put on circular lintels, but the glue alone held them in position and we pitied the owner of the house. Only one question remains unanswered, to-wit:—"Is steam dried timber more apt to warp than air dried?" We answer no; it is less, and this, in addition to the time gained, appears to us of such importance that we think the whole subject worthy of more consideration than we are now prepared to give it. Meanwhile, we advise not to hire steam for drying lumber before one is fully posted on the process. Green timber, in order to be dried thoroughly by steam, should be treated, first, for at least twenty-four hours by free steam, and then from eight to twelve days by dry or superheated steam. A single steam bath in a box will most certainly not effect a thorough drying, or make the wood even approximately like weather seasoned material. Quick drying of wood is an art hitherto little attended to by chemists, although it is an interesting and profitable field. Notwithstanding the general assertion that artificial processes damage lumber, we are among those who believe the day not far distant when wood will be dried artificially without deterioration for many mechanical purposes.—*The Hub*.

The Atlantic & Great Western Railway.

So much has been said through the public press relative to the Atlantic & Great Western Railway, that we have been to the pains of inquiring, at headquarters, the true status of the company, and the following is the result of our inquiries:

By virtue of legal proceedings in the States of Ohio, Pennsylvania and New York, the road and property of the company from Salamanca to Dayton has been sold, and purchased by Gen. Geo. B. McClellan, Hon. Allen G. Thurman and W. Butler Duncan, as trustees, for the benefit of creditors and stockholders, under a plan of reorganization agreed upon by a large majority of the holders of stock and debts. In pursuance of the plan three new corporations have been organized in the three States through which the road runs. The three trustees are directors in each of these companies, and Gen. McClellan and Mr. Duncan are appointed an executive committee to take charge of and manage the affairs of the three companies, and operate the road until the final consolidation of the three companies shall take place. This will be accomplished as soon as the time required by the laws of the several States shall have expired for proper notice to the parties interested. Gen. Geo. B. Wright, of Columbus, Ohio, has been appointed the representative of the executive committee in personal charge of all the affairs of the company on the line, and H. F. Sweetser, Esq., general manager—and both these gentlemen are now at Meadville, Pa., in charge. It is expected that this general supervision and management will be continued after the consolidation of the three companies, but until this consolidation takes place and a board of directors of the consolidated company elected, no speculations or promises should be indulged in as to the future.

Upon the sale of the road the lease to the Erie company terminated, and the road is now virtually in the hands of the stockholders, to be operated by them for the benefit of its lawful owners. In view of the complications involved in adjusting the affairs of the company to the new order of things, it is hoped the public and patrons of the road will exercise patience, and extend to the new management that confidence and support which is needed and we think deserved, believing as we do that every possible effort is being made to put the road in first-rate condition and provide for the prompt movement of all traffic which may be offered.

We understand no changes will at present be made in the operating force employed, where efficiency and integrity is found and the greatest economy secured.

Until the consolidation is perfected and the new board installed the present managers will feel compelled to postpone action on many matters pressed upon their immediate consideration; but they wish it understood that all communications will be filed and carefully considered, and as soon as possible, action taken thereon.—*Crawford (Meadville, Pa.) Democrat*.

—The earnings of the Kansas Pacific Railway for September and October show an increase of \$112,000 over the same month last year; up to Nov. 1, 134,481 head of cattle were transported over the road eastward, being 2,000 more than the entire number last year; 75,000 additional head will be carried to Kansas City for packing and for the Eastern markets.

European Capital and American Investments.

During the past week several of the changes in our feverish stock and gold markets have been ascribed to the anticipated movements of the Bank of England; and on Thursday a marked impression was produced by the announcement that the gold reserve in that institution had increased \$5,000,000, and that in consequence no advance would be made this week in the rate of discount. It is not easy to trace out all the intricate causes which project so much of the trouble from the London money market into our own. But one of the most powerful is, of course, the large sum that is owing here to foreign creditors, and the volume of European capital which is invested here and is liable to be checked in its flow if not called home in case of pressure or monetary derangement. As these anticipated troubles are almost wholly due to the payments by France to Germany, it may be somewhat reassuring to find that the chief perturbation from this cause has already spent much of its force. The indemnity payments amount altogether, as we have recently shown, to \$1,000,000,000, of which three installments, amounting together to \$300,000,000, have been already paid—partly in cash, partly in bills, and the remainder in allowances for railroads. Of the remaining \$700,000,000, \$600,000,000 will not be paid for three years to come. Hence the actual payments which concern the early future are but \$100,000,000, and this sum does not fall due till next spring, though it has, as we learn by cable, been already paid by non-negotiable bills, in consideration of certain concessions by France relative to the admission of Alsace and Lorraine manufactures across the French frontiers. These facts enable us to estimate to some degree the probable effects on the British money markets which are likely to occur from the payments which are now in course of liquidation between France and Germany. The whole of the payments past due must have gone in cash, or in bills which are maturing; the net payments, exclusive of the deductions on account of the Alsace and Lorraine Railroads, being \$235,000,000. Besides this sum France paid to Germany last January \$40,000,000, on account of the Paris indemnity, and the cost of maintaining the German troops in France has amounted to \$60,000,000 more. It appears, then, that the aggregate payments since January have been \$335,000,000, much of which must have been spent in France itself. How much is now on hand in Berlin, and what part of that aggregate is in bills is not known. But the belief is that the Germans have been converting their bills into coin as fast as possible, and that this coin has been, to a large extent, hoarded in the Government vaults.

If this be true, two questions arise; first, whether the process of converting the bills into cash has been impeded by any serious obstacles; and secondly, how long the policy of hoarding gold in Berlin can sustain itself in face of the demand for disbursements by the clamor of the other States of North Germany, to whom, as we have lately showed, a large part of the aggregate amount is due. At present we are not able to give a very positive answer to either of these questions. To some persons it may seem singular that the payment of \$335,000,000 in the course of nine months should cause so much trouble in the European money markets, while the weekly exchanges, which pass through the London Clearing House very much exceed it in amount

It is no doubt true that the London banks might clear the whole of the indemnity payments in the usual course of business with very little derangement of their financial machinery. But the trouble is that the payments are not made in the usual manner. The Berlin Government demands gold, and locks up that gold in its coffers. The result is somewhat analogous to what has frequently been observed here when currency has been locked up in our Treasury, and at a critical period withdrawn from the ordinary channels of circulating money.

Some troubles may also arise from the new coinage which is proposed to be adopted for Germany, by which the marc of about 25 cents is to take the place of the thaler as the standard of value. But for the reasons we have above urged it is scarcely possible that the German Government can keep locked up any large amount of gold as yet. The difficulties hence arising are rather for the future than the present. The debts of the various Governments are too urgent, and their necessities too pressing, to allow of much hoarding of currency. Hence the money which has already been paid by France can not be long in finding its way back into general circulation, and the trouble may perhaps be already at an end. For absolute certainty on the subject we must wait. And meanwhile the payments which were to be made next spring, and have just been provided for, are the fourth half milliard of the indemnity, or \$100,000,000, together with the further addition of \$32,500,000 interest at 5 per cent. on the remaining \$600,000,000 which France by the treaty is bound to pay till the principal is wholly liquidated. The effects of this payment may be too remote to produce any trouble. But in the absence of details this is not certain. And in any event there is no doubt that British capital will continue to seek to invest itself in our securities, though the activity of the movement has been and may still continue somewhat retarded.—*Fin. Chronicle.*

OLD AND NEW METHODS OF HANDLING GRAIN.—In the principal seaports, by the present system of handling "in bulk," instead of the former "bag and half-bushel" process, one hundred bushels of grain are weighed at a time, the scale-hopper being situated directly underneath the receiving hopper, both of which are fitted with suitable discharge-valves, the former having a rate of about a hundred bushels per minute and the latter twice that amount. The rule for measuring is an allowance per bushel of sixty pounds of wheat, fifty-six each for corn and rye, thirty-two for oats, forty-eight for barley, and sixty for peas.

To check the weight-master in his tallies, a representative of the boat or vessel discharging is always present, and, as a further check, an infallible register is automatically acted upon by the scale beam. This potent little device resembles the clock-shaped metallic barometer used by meteorological observers.

Formerly, the custom was to measure by the half-bushel. To accomplish this, a large force of laborers were employed in shoveling the grain to the hatchways, in passing the empty measures to the "striker," and again from him to the haggars and sewers, while another force was busily employed shouldering the plethoric bags and hoisting the same upon the dock or vessel's deck. The "striker" was so named, not from his pugilistic tendencies, but from the nature of his duty, which consisted of striking or leveling off each half-bushel measure, that the quantity should be exact.—*Evening Post.*

The Use of Soluble Glass for Rendering Wood Fireproof.

The fearful conflagration at Chicago has been the theme on which numerous homilies have been read, and from which many valuable lessons have been deduced. We might comprehend the main conclusions drawn by all the sages who have commented upon the subject in a few words, and say, that if people live in combustible houses they are likely to be burnt out; and that to build a fireproof building in the midst of lumber yards and wooden houses, which need only a spark to set them in a blaze, is next to impossible.

We can scarcely expect that the building of wooden houses will hereafter in all cases be forbidden by law, and no fireproof material has as yet been discovered which can take the place of the wood which now enters into the construction of both brick and stone houses. Iron beams and columns have proved entirely inadequate to withstand an intense heat. They are, under such circumstances, but little, if at all, better than wooden ones. They twist and curl up to such an extent that, in Chicago, buildings, it is said, fell down owing to the heat from neighboring fires. We can, however, with but little trouble and expense, render wood almost as passive with regard to fire as brick or stone; and we think that this precaution should be insisted upon by municipal authorities.

The process to which we allude, and on which there exists no patent, so that any one who likes can try it, is briefly as follows: the dried lumber is soaked for a short time in a solution of soluble glass, a silicate of soda or potash, and then immersed in a bath of lime water. In this way the silicate of soda is decomposed and a silicate of lime formed in the pores of the wood.

This substance occurs in nature as a mineral known as Wollastonite, and is both fireproof and insoluble in water, so that wood once treated in this way will never change its qualities. Soluble glass is largely manufactured in this country, and used for a variety of purposes. An old and well known chemical house in this city announces in our advertising columns that they are ready to supply this material in large quantities, and will doubtless furnish reliable information regarding the details of the best method of application.—*Engineering.*

THE DEVELOPMENT OF A NEW COUNTRY BY MEANS OF RAILROADS.—The immediate benefit derived from railroad building through a fertile country is manifest at several points along the Atlantic & Pacific Railroad. While new towns now spring up in the most hilly and uninviting portions of the country, and older towns have grown apace, several new towns and villages have sprung up in South-west Missouri that have had a most wonderful growth. North Springfield, Pierce City, Verona, Seneca, and other towns, have been generally very neatly and substantially built up since the railroad was completed to those points, and upon inquiry upon a late trip, we learned that they have each now a population of about 100 for each month of their existence; towns 15 months old have 1,500 inhabitants. The future growth of these new towns will depend largely upon the settlement and cultivation of the surrounding country; and this most important matter is as surely influenced by the liberality and enterprise of the railroad company as the thermometer is influenced by heat and cold.—*Pittsburg Com'l.*

New Mode of Puddling Iron.

A few years ago a patent was taken out by Mr. Samuel Danks, of Cincinnati, for puddling ore, or iron, by machinery, instead of, as heretofore, by manual labor. This improvement has since been introduced into several furnaces and iron mills in the United States. There is a commission from the English associated iron manufacturers, now in our city, come over especially to inspect the working of the patent in the iron rolling mill in this city. This English commission is composed of Mr. G. I. Snelus, associate of the Royal School of Mines, a scientific man; Mr. John A. Jones, a business manager, and Mr. John Hister, a practical mechanic. These gentlemen have brought over some English ore, to have it smelted, in order to see if the new process is as effective with their ore as with our native metals. We understand they have every reason to believe in the perfect success of the new method, with whatever ore it is used, and have recommended its immediate adoption in England.

It will be of immense advantage to all iron workers, not only from its economy of labor and time, but the improvement of the quality of the melted iron, through its perfect fusion and complete amalgamation. The new plan can not fail to receive universal adoption, and its success will be another evidence of the genius of our skilled workmen. For those who have not seen either process, we will give a short description of both.

The old puddling furnace—the word is derived from "puddle," a pool or hollow of muddy water—is cased or lined with fire brick, built up with a chimney, and cased outside with iron sheets. The ore, generally to the extent of 400 pounds, is put into this furnace, with limestone as a flux, and both are melted with a strong blast. The iron falls to the bottom, and forms a ball, or lump. But, in order that all parts of the metal should receive the effect of the fire, a man with a long poker is kept continually stirring up this heavy mass of metal, and, to facilitate the work, he generally divides the charge into three or four lumps, taking then at one time about 120 pounds to stir and work at. The constant heat and the incessant labor are immense drafts on the powers of any man; and, as few are either physically or mentally competent—for the business requires judgment and art for its successful management, together with immense labor—the wages paid are very much higher than for any other work in a foundry. For, according as the puddler is skilled and laborious, or otherwise, the iron is of good quality or bad. In fact, it is so oppressive a kind of labor, no human being ought to be asked to undertake it. And Mr. Danks has shown how machinery can be applied to do the business better, more economically as to time and fuel, yielding iron of a more certain and regular and superior quality, and turning out balls of from seven to ten times larger and more homogeneous, than by the hand process. The saving by the patent process is one-half the cost in both labor and time, and one-third in coal, and the superiority of the iron is very decided, and may always be produced of a like quality. There are ten patent furnaces now in use in the Cincinnati mills—all the hand furnaces being removed—each of which is able to fuse and turn out eight charges of 600 lbs. weight of iron each in ten hours. These masses of molten iron are immediately rolled and made into rails, or other forms of plate or bar. The first appearance of the smelted ore is like red hot sponge. It is seized by long tongs, suspended on a swing,

that catches it and puts it on rollers under a large wheel. Between these it is squeezed and lengthened out, and then conveyed again to the furnace, where it undergoes another roasting, and then again it is put under a series of rollers and formed into rail bars.

The patent furnace used is in outward appearance like the ordinary puddling furnace, but differs in several particulars. It has a fan blast under the grate to urge the fire and produce gas. It has jets of fan blast over the fire, injected for the purpose of insuring a more perfect combustion of fuel. This blast is regulated by a valve, to give the workmen the perfect control of the temperature suitable to the different stages of the puddling process. The fire hole has also a coil of wrought iron water pipe cast into it, to allow a stream of water to circulate around it and keep it cool; and the bridge plate, between the fire and the charge of metal, has also a coil of water pipe cast into it for the same purpose. Into the minute particulars of the building, casing and felting of the furnace we need not go. But the working of the revolving chamber, an important part of the patent furnace, should be understood, for it entirely removes the necessity for all oppressive manual labor.

The revolving chamber is made of two end pieces, like an open ended cylinder, hinged together with wrought iron bands. It has two holes, one to admit the gases over the bridge from the grate, and another serves as a doorway for the reception of the charges of metal or for their removal. The chamber rests on carrying rollers, to allow its free rotation, and is made to revolve by means of a toothed wheel fixed longitudinally upon it. The steam engine attached to the chamber can be made to revolve at any required speed, according to the different stages of the operation. When the furnace is charged with pig metal the melting down occupies from thirty to thirty-five minutes, during which a partial rotation is given to the furnace from time to time in order to expose all sides of the charge to the flame. The advantages to the workman are lighter labor and facility for a more advanced position as an intellectual being; and to the manufacturer many are already apparent, and we believe many more are yet to be recognized. One of the most manifest is in the increased size of the forgings. Machinery can work to almost any quantity, as the charges may each be as many tons as by hand power they were hundreds. The handworker's lump turns out plates rarely exceeding 3 superficial square feet, while a plate 30 feet long may with equal facility be forged by machinery. In plates for ship building, the increased length will be of the greatest importance. Large plates are made now, but they are fabricated only by greatly increased labor and expense, by piling up lump over lump, and smelting and hammering all together.—*Cin. Price Current.*

—An account from Fort Wayne says: Another section of 20 miles on the Grand Rapids & Indiana Railroad is completed and accepted by the Government. The next section north is about ready for the iron, which will be laid as fast as practicable. The line has been surveyed through to Traverse Bay, two routes having been gone over; it is not yet decided on which the road will be located. The citizens of Traverse county pledge themselves to furnish \$40,000 to procure a branch to Traverse city, 23 miles in length. This company now has 220 miles in operation from Fort Wayne northward.

Liquid Fuel.

We doubt very much if for ordinary furnaces, steam boiler or heating furnaces, petroleum ever becomes an economical fuel or a feasible substitute for coal; but for special purposes it is equally plain that there are numerous opportunities for its successful operation. These will be found under conditions where intensity and manageability of flame combined with power and rapid heating are essential. An example of this is found in welding machinery, in which the flame of a liquid hydrocarbon serves to maintain the metal at the requisite heat under circumstances where no coal furnace could give an equal degree of utility. The heating iron furnaces may or may not belong to the class just indicated, but the results achieved at the Laclede Rolling Mills in Missouri are such as to justify some hope in this direction. We find the apparatus and *modus operandi* described as follows:

"The oil is placed in a large tank having a capacity of 100 barrels, situated about 200 feet from the furnace. From this tank it is pumped through an ordinary three-quarter-inch pipe into a cylindrical generator about four feet high and two and one half feet in diameter. This generator contains about 600 copper tubes, each about five-eighths of an inch in diameter. In an adjoining fire-box steam is superheated to a temperature of about 800° Fahr., thence passing through a pipe into the copper tubes of the generator. The great heat thus created in the tubes generates the oil which fills the intervening spaces into a gaseous vapor. As quickly as it is generated it passes into a receiver which covers the generator in the shape of a dome, and which is filled with sponges to regulate the flow of the gas as it passes into pipes leading to the furnace. A jet of superheated steam is mixed with the gas in the receiver, and the oxygen thus supplied combines with the carbon of the vapor, forming a gas which burns readily and with intense heat without atmospheric aid. The supply of gas admitted into the furnace is regulated by a gauge in much the same manner as steam in a steam engine. The petroleum in the generator is kept constantly agitated by the admission of a small jet of superheated steam, which keeps the crude oil from depositing any residuum on the bottom or sides—thus preventing any accumulation of refuse, or leaving any sediment after the more volatile portions of the oil are generated into vapor. On entering the furnace the gas ignites at once, rushing through in a white flame of intense heat, imparting to the iron over which it passes an appearance of semi-transparency. In the experiments at Laclede Mills, the iron thus heated has been brought to a white heat in one hour, or one-fifth of the time required when coal is used for fuel."

—The "narrow gauge railway" fever has affected the people of the far off territory of Utah. The San Francisco *Bulletin* says that a new company has been organized at Logan, Cache county, to build the Utah Northern Railroad, narrow gauge, from Ogden to Soda Springs, through all the principal northern settlements and towns. Sufficient capital was subscribed, officers elected, and work commenced. The road is expected to be in running order to Logan by December next. John W. Young was elected president and superintendent.

The Magic Needle.

In Europe the chief power of the magnet was perhaps known, but never applied, for a thousand years. An Icelandic writer, Are Frode, makes the first mention of it near the year 1100, stating that a hundred years before, a famous pirate went in search of Iceland, under the guidance of three ravens, trained for the purpose, since, "in those days sailors of northern regions did not yet know the use of the leadstone." For he called it the lead or leadstone, from which our loadstone is derived. Even this historian, however, knew only a magnet suspended by a thread, and the compass itself was yet undiscovered. At first, the magic needle was used with amusing clumsiness, as we learn from a manuscript, dated 1203, in the Royal Library in Paris. An ugly, black stone, called *mariniere*, we are told, which sailors valued highly, was taken out when nights were dark, and a needle rubbed with it lightly; the latter was then cunningly placed upon a straw, and set afloat in a basin, when the point would indicate the north.

Another peculiarity of the magic needle was a cause of much anxiety and peril to the discoverer of our continent. When the great navigator had ventured about two hundred leagues into the Atlantic ocean, on the 14th September, 1492, he noticed for the first time, that the needle, at evening dusk, no longer pointed due north, but deviated several degrees in a north-westerly direction, and the next morning the deviation had increased. Full of anxiety and wonder, he watched it carefully, and, to his consternation, the farther west he sailed the more the needle appeared to deviate. At first he kept his discovery to himself, fearful lest he should alarm his crew and defeat his purpose; but soon the men at the helm noticed the change, and were filled with grievous apprehensions. They fancied they had penetrated into a new world, ruled by other laws than those to which they had been accustomed. If the magic needle lost its power what was to become of them on the boundless ocean? Never, perhaps, was Columbus greater than when, sternly suppressing his own fears, he told them that the magnetic needle pointed, not toward the north pole on earth, but toward an invisible part of the heavens, which changed its place together with all the heavenly bodies. They believed the man whose vast knowledge and marvelous energy they had learned to appreciate; their minds were calmed, the voyage continued, and a New World discovered. Henceforth the magic needle achieved triumph after triumph. With such aid, Diaz, Cabral, and Gama could cross vast oceans, and Magellan and Sebastian Cabot sail around the whole earth—thus ending forever the objections made by superstition and bigotry, and teaching man the true form and nature of the globe which he inhabits. While, heretofore, the majority of vessels, in the Mediterranean even, had been wrecked, or at least had reached their desired haven only with a small part of their cargo, now insurance companies were formed in all the large seaport towns, and the premium, even for India voyages, became soon so small as to make insurance the rule.—*Appleton's Journal*.

—A dispatch from Hannibal, Missouri, dated Nov. 7th, says the election of directors of the Hannibal & St. Joseph Railroad, at that place, yesterday, resulted in the triumph of the Toledo, Wabash & Western, and the Lake Shore and New York Central interest, over the Chicago, Burlington & Quincy and the Boston interest.

Electric Signals in Mines.

In Silesia and in Westphalia the use of electric signals in shafts is becoming very general; they are also very much employed in the basin of the Saar, where they are inseparable from mechanical hoists, etc. These electric apparatuses have been applied without modifications to the *Graf-Beust* mines (Essen); their characteristic is that the voltaic circuit is closed by the earth. Along the circuit are interposed alarms and the manipulators, visible at every stage of the mine; the current is constantly closed; the alarms sound when the working of the manipulator interrupts the current; the pile is composed of twenty elements of brass-zinc plunged in a solution of sulphate of magnesia. At the mine of *Rhein Elbe*, the system for the transmission of signals is quite different; they are transmitted from the bottom upwards, and *vice versa*. In the transmission of signals from the bottom to the surface, a complete circuit is formed between these points. The manipulator is composed of a wooden fork, the teeth of which are covered in the interior with two sheets of copper in contact with the conducting wires; at the lower extremities of the sheets there are two metallic pendants, which are brought into contact at the moment of interrupting the currents by closing the teeth of the fork, when the passage of the current sounds the bells placed at the surface. To transmit signals from the surface to the bottom, it is necessary, of course, to have a manipulator at the surface and bells at the bottom, but a single conductor only is required to be added, connecting the manipulator with the bells. The current is closed by the wire attached to the bells. The pile used at *Rhein Elbe* is composed of six elements of zinc charcoal plunged in a solution of mercuric sulphate, renewed every two months, for an extraction of from 400 to 450 tons per day. The wires are protected by a wooden sheath. The erection in a shaft 220 yards deep has cost nearly £40: in which sum are comprised the expense of materials required for a year and two spare elements. Each additional yard would cost about 3s.; in a dry shaft the conducting wire can be covered simply with gutta percha, in which case the expense would only come to about £24.—*Mechanics' Magazine*.

CAIRO & ST. LOUIS RAILROAD.—The St. Louis *Republican* says: For nearly 70 miles this road will run through the richest coal fields in the Mississippi valley, including the celebrated Big Muddy and Chester coal fields. It is of the first importance that these celebrated coals, which by actual practical test are the only coals in this portion of the country except the Indiana coal, suitable for smelting our Missouri iron ores, be made easy of access to our iron works. This road being the only direct road to Big Muddy and Chester coal fields, will convey the coal for the iron works of Carondelet and vicinity; it must cheapen the coal, and supply our furnaces with such facilities as to give a new impetus to our iron manufactures.

☞ The receipts of foreign sugar in the United States in 1870 were 468,957 tons, against receipts in 1869 of 501,354 tons; while the consumption of foreign sugar in 1870 was 483,892 tons, against a consumption in 1869 of 447,899 tons. The consumption in 1870 absorbed all the imports and 14,935 tons besides, with the exports reducing the stock in the country to 23,964 tons.

THE TRANS-CONTINENTAL ROAD.—The Clarks-ville (Texas) *Standard* of the 9th inst., has the following in regard to the Trans-Continental Railroad: "On Monday, we were pleased to greet again, at our sanctum, our old friend (though quite a young man) Gov. Throckmorton, who had come up from Jefferson, and brought us good news. The engineer corps of the Trans-Continental, including the chief, Gen. Buell, had arrived and gone to work \$250,000 worth of iron, which is estimated as 50 miles, would be afloat from a European port on the 9th (to-day). This iron is for the road from Jefferson to this place. The company will apply to the Legislature for authority for a branch from the Southern Pacific, either from Marshall to Jefferson, or some intermediate point, between Marshall and Shreveport, to be constructed immediately, to enable them to bring up their iron and equipments, without detention from low water, between Shreveport and Jefferson. Gen. Buell, on his way out, made arrangements at New Orleans for the immediate forwarding of the first lot of iron, as soon as received from Europe. Gov. Throckmorton has recommended to President Roberts to have the road constructed to a point north of Sulphur, Bowie county, as early in December or January as practicable, to enable the carrying of this year's cotton crop of Northern Texas. The leading citizens of Bowie, who were addressed by Gov. Throckmorton, pledged themselves to vote a subsidy to the road, which will greatly enhance their interests. The company will not accept the subsidy voted by the Legislature at its late session, unless the requirements of the act are changed. They would rather select their own time and point of junction for the Southern Pacific and Trans-Continental without the subsidy, than to have the point of junction so far west, over a route the local work of which would be more expensive than the value of the subsidy. It is presumable, we think, that the Legislature, the work for pay portion of it, not having yet received the promised checks, will make the desired change. Otherwise the company will take its own course, and retain its loose change."

MAKING OF POCKET KNIVES.—Few people have any idea through what a number of hands their pocket knives have passed in the process of manufacture. A bar of steel destined to furnish a number of blades is heated to redness; a length is cut off, and the forger speedily "moods" this, that is, shapes it roughly into the form of a pocket knife blade. Another heating is then required to fit the end for being fashioned into the tang, and yet another before it can undergo the further operation of "smithing," the last stage of which is the stamping of the mark of the thumb-nail to facilitate opening. The tang is then ground, and the blade marked with the name of the firm. The slight bulge on the reverse side caused by this operation is removed by fire or the grindstone. The blade is then hardened by heating up to redness, and then plunging it into water up to the tang. The tempering process follows next, the bluish yellow tint being considered as indicating that the proper degree of heat at which to immerse the blade once more in cold water has been attained. After this the various kinds of blades are classified in the warehouse, and undergo sundry grinding operations to fit them for being hafted. Twelve distinct processes have by this time been gone through, and many more are necessary before the knife is completely finished.

LARGEST STEEL RAIL MILL.—The Bethlehem Iron Company's new steel rail mill is destined to be the largest in the world. It is being built under the management of John Fritz, chief engineer and superintendent of the company. Its dimensions will be, 1,184x105 feet, and is in the form of a cross. It is 30 feet high, and arched by iron and slate roofs. Its destined working power is 300 tons of steel ingots per day, though they do not propose at present to furnish machinery for over 100 tons daily. This even will present a capacity double any yet existing in our country. There will be eight 5 ton converters and two train rolls, one of 24 inches and the other of 28 inches diameter, driven by two condensing engines. The designer has come to the work with a full mind, having made the Bessemer works, both at home and abroad, a special study, and will add to the structure many new features for saving labor. It is claimed that it will turn out more steel with less labor than any manufactory yet established. Such an enterprise is exceedingly creditable to the country and State, and to the energetic firm that is projecting it. The matter is one of more than ordinary interest to the cause of American manufactures, and of particular attraction to Pennsylvania, which already leads so handsomely in this line of industry. Especially will it demonstrate to England that we are not only not dependent upon her in this line of industry, but that we are not behind her in any new manufacturing interest.—*Phila. Press.*

NEW ZEALAND RAILWAYS.—A large graving dock, just constructed at Port Chalmers, New Zealand, was recently opened for use, with appropriate ceremonies. Port Chalmers has been fixed upon as the port to be connected with San Francisco by the new line of steamers between New Zealand and California. Railroads are also in course of construction from Port Chalmers to other important places on the island. These modern improvements, it is argued, will accelerate the doom of the Maories, who, like the American Indians, will be swept off the surface of the earth before the advance of the white man. In half a century, it is believed every native Maori will be destroyed, just as the aborigines of the sister colony of Tasmania have been totally extinguished.

PIG IRON.—The probable production of iron in the leading countries of Europe next year, is given as follows: Great Britain, 5,100,000 tons; France, 1,062,000 tons; Germany, 1,907,000 tons; Belgium, 526,000 tons; Austria, 365,000 tons; Sweden, 293,000 tons; Russia, 420,000 tons; other European countries, 500,000 tons. Assuming that this estimate is approximately realized, the production of pig iron in Europe next year, will be about 9,773,000 tons.

—Detroit has turned out a successful street car dummy. The car is so arranged that the engine consumes its own smoke and steam, and moves along the street like a thing of life, noiselessly and smoothly. The cost of running it is four-fifths less than by horse power. One dollar per day will keep it in fuel, and two men can run it. It is so arranged that the engine only occupies surplus room under the floor of the car.

—The Baltimore & Ohio Railroad, with its branches, now possesses a rolling stock consisting of 363 locomotives, 250 passenger cars, and 6,000 freight cars, which are fully able to meet all demands upon them.

Mont Cenis and Hoosac Tunnels.

The following statement will give the reader an opportunity of comparing the dimensions, cost, etc., of the two great tunnels of the world:

MONT CENIS TUNNEL.—Length, 12,236 metres, or nearly eighty miles; width, 26 feet 8 inches; height, 20 feet; cost, \$13,000,000; time occupied in construction, 9 years; number of workmen employed, about 2,000.

HOOSAC TUNNEL.—Length, 26,061 feet, or about 4½ miles; width, 24 feet; height, 21 feet; cost, about \$9,000,000; time of construction when completed, nearly 20 years; number of workmen employed, about 700 at present, but much less during most of the time the work has been prosecuted.

—Mr. John Taylor Johnston, the president of the Central Railroad of New Jersey, has issued a circular in which he announces a return to quarterly dividends of 2½ per cent. The company's receipts for 1871 up to the 1st of October were \$1,801,869, a profit of \$2,167,530. More than half the receipts were from coal, viz.: coal, \$2,640,443; merchandise, \$1,146,051; passengers, \$952,984. The cost of the entire road has been \$10,784,000. It is now double tracked from Somerville to Jersey City, and the laying of two more tracks will soon be commenced. The whole line is now being laid with steel rails. The equipment of the entire line of 180 miles with the branches in Pennsylvania and New Jersey, has cost \$6,800,000. The stock of the company will be increased by the issue of \$5,000,000 in scrip, convertible into new stock as soon as legislative authority for the issue shall have been procured.—*Am. R. R. Jour.*

—The *Arkansas Gazette*, of Oct. 24, says: "We learn, upon what we deem good authority, that all differences between the conflicting interests in regard to the construction of the Cairo & Fulton Railroad have been settled. To-day, or to-morrow, track laying will commence on the second twenty miles of the road. Enough iron is here to complete the road to Little Red river. The second twenty miles, in order to save the land grant, have to be completed by the 20th of December.

—The Pine Bluff (Ark.) *Republican* says that a contract has been executed, in the sum of \$2,000,000, providing for the immediate construction of the Pine Bluff branch of the Memphis & Little Rock Railroad.

—The dry goods trade of Philadelphia amounts to \$60,000,000 a year, of which \$40,143,000 is of home manufacture, according to the revised census, that gives the following statistics: Carpets, \$10,000,000; prints, \$5,500,000; silks, \$3,000,000; blankets, \$2,290,000; coatings, \$653,000; Balmoral skirts, \$500,000; worsted goods, \$3,000,000; fine dress goods, \$1,200,000; white cottons, \$2,000,000; colored cottons, \$6,000,000; webbing, braids, &c., \$2,000,000.

—A Russian journal says: "The splendor with which the members of the Imperial family travel by railway will be much increased next summer, for several portable silver fountains have been ordered at an establishment in the south of Germany, which, when fitted into the Imperial saloon carriages, and fed by a supply of iced water from a tank in the roof, will impart a luxurious and constant coolness to the atmosphere."

The Babcock Fire Extinguisher.

STRUCK BY LIGHTNING.

[From the *Marinette (Wis.) Eagle*, July 13, 1871.]

During the severe thunder storm last Saturday morning, a charge of electricity melted and severed the wires in the telegraph office at the N. Luddington & Co.'s store, and set fire to the window casings. They were enveloped in flames in an instant, and the employees in the store vainly attempted to extinguish the flames with water. At this critical juncture, Caleb came to the rescue with a Babcock Fire Extinguisher, and soon put an effectual quietus on the destroying element. But for this timely aid, the store and contents would probably have been destroyed. All who were present felt the electric shock more or less sensibly, but fortunately no one was injured.

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No. 167 Walnut Street, Cincinnati, Ohio.

The Railroad Record.

E. D. MANSFIELD, - - - - - } Editors
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A. J. HODDER, - - - - - }

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The Railroad Record,

PUBLISHED EVERY THURSDAY MORNING,

By Wrightson & Co.,

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Our Financial Condition.

In our last number we endeavored to show some of the great changes which have occurred within a few years in the relations of personal property, the abundance of active capital, and the increased amount of money for reinvestment. These facts bear, as we have shown, strongly upon the prospects of new railroad enterprises. Already we have seen many new enterprises spring up, and generally with strong prospects of success. In this State of Ohio, with 3,500 miles of railroad to 40,000 square miles, or in the ratio of 1 mile of railroad to 12 square miles, even here new railroads are undertaken, and that, too, with good promise of profitable results. There is the Atlantic & Erie, which is steadily progressing, and which will open a grand highway from the south-eastern coal mines of Ohio to Toledo and the north-western counties. Then we have the Great Northern, which passes through an abundant and fertile country, and will open up a new highway, both for trade and lumber, to Cincinnati. Then we have a new railroad company, just chartered, from Columbus to the Sunday Creek coal mines. Then, we have two or three new roads in the north-eastern part of the State. All these promise well. But if we were to-day in the very best condition we were ever in before the present currency was established, we doubt whether we should escape a twelve-month without a commercial crisis. Commercial crises will always occur, at intervals of few years, unless the currency is elastic. That is the single quality which prevents commercial

disasters arising from the present want of money. If we had now specie (gold) payments; the banks would be constantly in danger; for they would deliberately promise to do what they could not do, to make all their payments in gold. If their customers pressed for money they must curtail their debts and reduce their currency, the very thing they ought not to do. If the pressure became severe, they must suspend, and cause many merchants to suspend. This happened before the war frequently, and if we had specie payments since the war, there can scarcely be a doubt that we should have had the most severe and crushing commercial disasters. But we have not. On the contrary, while many merchants have complained of dullness, the trade of the whole country has immensely increased, and all branches of manufacture are active and prosperous.

The first thing, therefore, to notice is that our currency is sound, uniform and abundant. Currency, or money, is the great instrument of commerce, and to have that instrument in perfect order, sound and strong, is the first element of commercial success. There is no doubt we owe much of our commercial and manufacturing prosperity to the stability and uniformity of the currency. If this be so, the first question is, shall we keep this sound and stable currency? We think that it will certainly be kept for a number of years; and in that case the present railroad enterprises will be safe, if prudently conducted. There is always a large party of "hard money" people, who are such because of their early education and old prejudices. These men honestly believe that gold is a standard of value, and think that the system we are going on is wild and visionary. They are like the old people of Europe, who believe a king and nobles are necessary to the existence of society. But the last ten years of our experience have done much to nroot these old ideas and prejudices. We have shown to the world that a paper money currency is entirely consistent with the greatest progress and prosperity. That fact can not be put aside. Our experience is not a thing to be denied. It is a fact, that this day the United States has the most stable, the most uniform and the most useful currency in the world.

Having thus considered our currency, there is another thing to be considered—the credit of our Government. Our present currency rests upon the credit of our Government; and on what does the credit of our Government rest? On three things: 1. The faith of the American nation; 2. The property of the American nation; and 3. The unlimited power of taxation. Now, everybody knows perfectly well, that either of these is a sufficient basis for a national currency. The faith of this nation will never be violated. The property of the nation, considered simply as property, is immense, enough to pay the national debt. Then, the power of taxation is unlimited.

What has happened since Lee surrendered at Appomattox? Why, we have paid five hundred and fifty millions of the public debt! Such a thing was never known in the history of nations. How did we do it? Why, the American people are honest. They mean to meet every obligation, they have and they will.

A great deal has been said about legal tender notes. They are as constitutional as any act of the American Government. They have saved the nation, and they ought to be continued as the best currency this country ever had. The Supreme Court has recently decided them constitutional; and we trust the country will keep them till it finds out something better, and that there is small prospect of its doing.

Chesapeake & Ohio.

CHICAGO CONNECTION.

A few days ago the people of Hillsboro assembled to hear a note from Mr. Huntington read, in which they were deeply interested. The note clearly indicates the position and views of the Chesapeake & Ohio road in reference to the course it will adopt to secure traffic from the North-west. Col. Trimble deserves and has richly earned the highest thanks and good will of his neighbors for his indefatigable labors in bringing about this result. The following are the conditions imposed:

"If you can secure the right of way from Symmes Creek to Dayton, and subscriptions that will unquestionably be paid to the amount of \$850,000, together with the old work on the line, we will build the road."

The people of Hillsboro thereupon immediately met and passed the following resolutions:

Resolved, That the proposition of the Chesapeake & Ohio Railroad Company made by letter from C. P. Huntington, president of the company, dated October 20, 1871, presented through Col. Wm. H. Trimble, that "If you can secure the right of way from the mouth of Symmes creek to Dayton, and subscriptions that will unquestionably be paid, to the amount of eight hundred and fifty thousand dollars (\$850,000), together with the old work of the line, we will build the road, is fair and liberal, and every effort should be made to comply with the generous terms offered by said company.

Resolved, That committees be appointed in each county, town and township through which the proposed line passes, to obtain stock, right of way, &c., and comply fully with the terms proposed, and that every effort should be made to secure the road.

The question is will the "People along the line" be able to do it. If Cincinnati was on the line, and it depended on her, we should say no, at once. But these country folks, with Col. Trimble at their head, will do it, sure as you live, and he don't die!

CHURCH'S MUSICAL VISITOR for November, John Church & Co., Cincinnati, Publishers, is at hand, the musical contents comprise the famous "Thousand and One Nights," as played by the superb Theodore Thomas' Orchestra, and "Ye Pretty Flowers, Good Night," with English and German words set to a beautiful German air. An approved portrait of Marie Krebs, the favorite pianist with the above-mentioned orchestra, adorns the first page, and is accompanied with a brief biographical sketch. The publication of portraits and sketches is hereafter to be made a feature of this elegant magazine. An engraving of the celebrated Davidson Fountain, recently erected in Cincinnati, will appear in the December number. We notice several desirable improvements in the last issue.

CARRIAGE AND CAR PAINTING.—We have received from Geo. E. Stevens & Co., Publishers, 39 West Fourth St., a copy of "The Carriage Painter's Guide," a neatly bound volume of 126 pages, in which carriage painting as an art and science is ably treated.

As the painting of railroad cars as well as carriages now demands the highest art, this little book will give many valuable hints both as to the material to be used and the arrangement of colors to give the most beautiful effect. The price of the work, \$1 00, brings it within the reach of all painters.

After the Fire.

THE SCHOOL FESTIVAL.—Quarterly magazine, devoted to original matter, for Day School and Sunday School Exhibitions, and Public Occasions.

The October number of this popular magazine (which was destroyed by the great Chicago fire, when all ready to mail) has been reprinted, and has just reached us. As its subscription list was burned, the Publishers request us to ask their subscribers to send their addresses, stating what numbers were yet due them, and to remit their subscription for next year. Let all teachers and pupils subscribe now for the School Festival—they all need it. It costs only 50 CENTS a year, in advance, or 15 cents for a single number.

The Publishers were very heavy losers by the great fire, but they don't propose to allow their subscribers to lose anything.

Send, by mail, to ALFRED L. SEWELL & Co., Publishers, Chicago, Ill.

—The Cairo and Fulton Railroad Company, of Arkansas, under the new organization, is composed of the following officers and directors: Thomas Allen, President; H. G. Marquard, of New York, Vice-President; St. Louis directors: Sylvester H. Laffin, Elon G. Smith, Wm. R. Allen, Wm. R. Donaldson, J. M. Loughborough, and L. B. Clark. A very important trade with Arkansas will now be secured to St. Louis which, but for the exertions of friends of the Iron Mountain road, would have been diverted to other points.

Kentucky & Great Eastern Railway.

[From the Maysville Bulletin]

Most of the new roads which of late years have been constructed in the North-west, or indeed in any part of the country distant from the Atlantic States, have labored under the disadvantage of having from the newness of the country, to create the business necessary to afford them employment and give them profits. It can not be so with the Kentucky and Great Eastern Railroad. It begins in the very heart of business, runs through a country alive with all the productive industries known to civilization, and ends in the very center of trade and commerce. From the very day the engine starts, there will be as much freight and travel for the road as it can well accommodate. Take alone that part of the road which runs along the Ohio river from the city of Newport to Big Sandy, and estimate for a moment the vast amount of products, manufactured and agricultural, which will find their way to market over the road. From the counties of Lewis, Greenup and Boyd, the people will send their hoop poles, tan-bark, lumber, building stone, coal and iron in vast quantities. Mason and Braeken will send their hogs, fat cattle, horses, tobacco, wheat, corn, barley and other products. These may not all pass over the railroad, but a large portion of them necessarily will. The river can not be more than half the time depended upon, and at such a season as we have had for the last two months, and are likely to have for some time to come, it is wholly unreliable.

There are, in the counties of Greenup and Boyd perhaps twenty furnaces in operation, producing annually more than 60,000 tons of pig iron, which, at the average market rate of \$33 per ton, would amount to \$1,980,000. We can give below the annual products of eleven of these furnaces:

	Tons.
Ashland, hot blast.....	12,000
Star, hot blast.....	3,500
Mt. Savage, hot blast.....	3,000
Buena Vista, hot blast.....	3,500
Belleville, hot blast.....	3,000
Buffalo, hot blast.....	2,000
Hunnewell, hot blast.....	2,500
Pennsylvania, hot blast.....	2,500
Laurel, hot blast.....	2,000
Raccoon, cold blast.....	2,000
Boone, hot blast.....	2,000

Total..... 37,500

Most of the products of these furnaces find a market at Cincinnati, Louisville, New Albany and points below, and would be transported upon the railroad because of the convenience of shipping and the rapidity of delivery. The railroad leading from Ashland out into the coal region, brings to the river immense quantities of the finest quality of stone coal, much of which in seasons like the present, would pass over the railroad to all the river towns below, and to the interior from Maysville. The Eastern Kentucky Railroad, passing by Hunnewell to Grayson, in Carter county, also passes through the coal region and brings from the mines of the company an immense supply of the very best cannel coal to be found in the West, as well as the products of five furnaces. The limekilns at Duval's landing, and other places in Lewis and Greenup counties, turn out each sixty or more barrels per day of the best lime produced this side of the State of Maine, and now supply the demand for that article from Cincinnati to West Virginia. The town of Vance-

burg ships annually of the products of Lewis county to points below, not less than two hundred and fifty thousand dollars in value. Concord, Quincy, Greenupburg, Ashland and Catlettsburg, on the Kentucky side, all contribute more or less to swell the tide of trade and commerce which flows along the course of the Ohio river, and most of which would seek the rapid, safe and reliable channel of the railroad. It is not only the products of the Kentucky side of the river that would employ the services of the railroad, but the iron industries of the Ohio side, and the commerce of Hanging Rock, Ironton, Sciotoville, Portsmouth, Manchester and other places on the Ohio side. The contiguous territory upon both sides of the river, back of the places we have enumerated, would soon accommodate itself to their great and leading artery of commerce and pour its tributary streams upon it.

We do not think we exaggerate the business the road will do. The resources of the country through which it passes are too well known and the history of all enterprises of the kind too convincing to leave room for doubt, that all we have said will be realized. The people interested in the counties along the road need, therefore, have no fear whatever that their subscription to the capital stock of the company will not be profitable. Every other through route from east to west pays large dividends upon its stock, and so assuredly will the Kentucky and Great Eastern.

West Virginia—Coal and Iron.

The New York *Tribune* in alluding to the development of the vast mineral resources of Virginia and West Virginia by the construction of the Chesapeake & Ohio Railroad, gives a very fair resume of the extent and value of their coal and iron deposits. It will be remembered that the Chesapeake & Ohio crosses from the mouth of the Big Sandy to the Kanawha, and follows the waters of this stream almost due east to the Alleghenies. It cuts square across the great mineral belt, and will unquestionably do much to develop its wealth.

The same remarks, however, and statistics, apply not only with equal, but with threefold force to the results that will be attained by the construction of the Kentucky & Great Eastern Railway, extending from Cincinnati to New York, on the shortest possible route, and having the longest possible reach (running diagonally) over the great Appalachian coalfield, and direct to the great markets at either end of the route,—Cincinnati in the west, and Baltimore, Philadelphia and New York in the east.

The certain and speedy completion of the Chesapeake & Ohio Railroad, connecting by rail every important city of old Virginia, through the heart of West Virginia, with the valleys of the Kanawha, Ohio and Mississippi, gives a new value to the mineral wealth of both the States traversed by that great work.

West Virginia, which embraces 16,000 of the 55,000 square miles of the great Allegheny coal basin—the largest and among the richest known to exist in the world. Its center seems to be the valley of the Great Kanawha, the chief river of West Virginia, wherein Prof. Ansted reports nearly twenty workable seams of coal, with an aggregate thickness of over seventy feet. Its horizontal position, proximal

ity to the surface, and freedom from noxious gases, render it the easiest mined coal in America. From this field the coal is now dug which supplies New York and Philadelphia with gas. It has been computed that most of this area will yield 45,000 tons of coal to the acre, or 28,800,000 tons to the square mile; much of it is so disposed as to render pumping or lifting unnecessary. Immense quantities of it are now hoisted down the Kanawha and Ohio, finding markets all the way down to New Orleans. Splint, cannel, and every other variety of bituminous coal, are found in different parts of this vast field. The splint is widely regarded as the best coal known for smelting iron from ore, which exists in great abundance all through both Virginias. It is probable that the valley of the Kanawha, when traversed by the Chesapeake & Ohio Railroad and its branches, will be found one of our best localities for making good pig iron cheap; while the cannel coal yields sixty gallons of superior petroleum to the ton, and has been, as it probably will again be, the surest and most profitable source of that valuable oil. The seams of cannel coal often show an aggregate thickness of fourteen feet, giving 21,000 tons to the acre, containing 1,260,000 gallons of crude oil. And fit timber for oil casks is nowhere else so abundant as in West Virginia.

Iron ore is found in most of the counties of the two Virginias, and has been mined to profit in at least twenty of them; the James River canal and most of the Virginia railroads (laid with British rails) traverse or cross it, as the Chesapeake & Ohio either does or soon will. When the Chesapeake & Ohio and Norfolk & Great Western shall have been finished, the requisite branches and connections will almost build themselves. When these roads shall have commenced freighting ore to the coal fields and coal back to the ore beds, Virginia may profitably supply half the seaboard and a third of the Ohio valley with cheap and excellent iron. The fact that the Chesapeake & Ohio Railroad had to be cut, for a considerable distance, through a vein of coal eleven feet thick, will serve to convey some idea of the mineral wealth of the two Virginias. A new railroad from the Chesapeake & Ohio at the junction of the Greenhrier with the New river, forming the Great Kanawha, will run up the valley of New river, crossing the Virginia & Tennessee and the Norfolk & Great Western roads, carrying the coal of the Kanawha valley to the great ore beds of South-western (old) Virginia, and incite unvented beneficent activity in ironmaking therefrom.

In most counties of either Virginia, excellent coal or ore (often both in close proximity) can be bought at prices ranging from \$5 to \$50 per acre. Many of these acres have a rich, deep, virgin soil, with a splendid growth of forest trees covering two-thirds to three-fourths of them—lands which in Pennsylvania would be deemed dirt cheap at \$1,000 per acre. Who can doubt that free labor with railroads will soon give a like value to the mineral lands of old and of West Virginia.

—The Atchison, Topeka and Santa Fe Railroad Company, on the 28th let the building of the extension of the road to Fort Larned, one hundred and fifteen miles from Newton. It is to be completed by the first of May next. The country through which this passes is almost entirely unsettled, but it is as good land as there is in the State, and is open to settlers under the pre-emption and home-stead acts.

NORFOLK AND GREAT WESTERN RAILROAD.—A telegram to the *Richmond Enquirer*, dated Danville, Virginia, October 26, says: "Colonel Flournoy, President Norfolk and Great Western Railroad, reported to the meeting of stockholders a contract entered into with competent parties in New York, and through them with parties in London, to construct the Norfolk & Great Western Railroad. The works to commence at Danville, going west, by December 1, 1871, and on the eastern division as soon as subscription on that division reaches \$3,600,000. The subscription on that division now reaches \$1,400,000. One million six hundred thousand dollars is to be raised by Norfolk, Portsmouth, &c. The contractors provide to pay off all debts of the company, and to receive county subscriptions at par—securities to be paid to the contractors as the work progresses, and the road is not to be turned over to them until one half is constructed. The Allen line of steamers already run between Norfolk and Liverpool, and the Immigration Society co-operates with them. England is more interested in Virginia than in any other Southern State. Colonel Flournoy was unanimously re-elected President. Directors—George W. Read, E. B. Turnoult, Elsha Barksdale, Jr., Fulwar Skipwith, F. L. Hall, E. A. Drury and W. W. Wood.

CAIRO & FULTON RAILROAD.—Mr. Thomas Allen has been elected President of the Cairo & Fulton Railroad Company, in Arkansas, together with the following: Vice President, H. G. Marquard, of New York; St. Louis Directors, Sylvester H. Ladin, Elton G. Smith, Wm. R. Allen, Wm. R. Donaldson, J. M. Loughborough, and L. B. Clark.

The road has a grant of nearly 2,000,000 acres of the best agricultural lands in Arkansas, which will furnish a basis for raising means to insure its early completion. It is the expectation to have the cars running between St. Louis and Little Rock within twelve months. The road runs from a point in Butler county, Missouri, on the State line, where it connects with the Arkansas branch of the Iron Mountain Railroad, through Arkansas south-west to the Texas line—eighteen miles beyond Fulton on Red river. It passes Jacksonport, on White river, Searcy, Little Rock to the terminus, 301 miles in Arkansas, and a total from St. Louis to the Texas line of 485 miles. It crosses the great valleys of White, Little Red, Arkansas, Ouachita and Big Red river. At the Texas line the road will connect with the International line, now being built from Fulton to Laredo on the Rio Grand. —*Railway Review*.

—A railroad meeting was held at Savannah, Tenn., a few days ago, attended by two thousand citizens of Hardin and McNairy counties, to discuss the advantages of narrow-gauge roads, and to consider the prospects of the contemplated road from Memphis through Somerville, Bolivar, Purdy and Savannah, on toward Columbia and Knoxville. A correspondent says: "Some idea may be formed of the dinner, when I tell you that there were four tables, each four hundred feet long, literally bending beneath the mutton, beef, kid and shoat, supplied without stint, with a profusion of all kinds of vegetables, pies, &c."

—The amount of the Virginia State debt funded under the act of last session, on the 11th instant reached \$20,400,000. The whole debt is \$40,000,000, one-third of which is chargeable to West Virginia.

WHEELING & LAKE ERIE RAILROAD.—This company was incorporated 6th of April, and the 20th of September the stockholders elected a board of directors, president, treasurer and secretary. The directors were requested, by a resolution, to make a locating survey.—Wheeling has pledged aid to any company building a road terminating at Wheeling and running thence north west towards the lakes. This, with other local subscriptions, makes the amount pledged \$10,000 a mile. The road, says a correspondent of the *Pittsburg Commercial*, is much needed, and would give to Wheeling better facilities and more beneficial to the manufacturing interests of the city—as her connections will be with the Pan Handle at about the same distance as by the Pittsburg, Wheeling & Kentucky Railroad, and if the city could secure the trade of the lakes, the Baltimore & Ohio company would gladly extend to them the right hand of fellowship. The engineers sent by the Eastern capitalists to investigate the route have pronounced it practicable, and have given the directors positive assurances that if the people along the line do their duty, the cars will be running to Wheeling in less than eighteen months. The charter provides for a road from Wheeling, passing through the counties of Belmont, Jefferson, Harrison, Tuscarawas, Carroll, Stark, Wayne, Ashland, Medina, Huron, Erie, Sandusky, Ottawa and Lucas, to Toledo, 150 miles.

ATLANTIC, MISSISSIPPI AND OHIO RAILROAD.—A suit was lately brought in Richmond, Virginia, in the name of James E. Tyson, of Baltimore, against the directors of the Atlantic, Mississippi and Ohio Railroad (General Mahone's 'south side' combination), to restrain them from consummating a loan upon the property understood to be in process of negotiation. This suit was last week dismissed upon the ground, as reported, that it had not been instituted in the proper court, and accordingly a similar suit was entered on the 23d ult. at Lynchburg, Virginia, in the United States Circuit Court for the western district. The bill is signed by J. Dean Smith, Wm. and J. W. Daniel, as counsel for the complainant. The order of Judge Bond fixes the 15th of November as the time for hearing of the case.

Alluding to the alleged purchase by the Pennsylvania Railroad interest of 10,000 shares, or a controlling portion of the stock of the East Tennessee, Virginia and Georgia Railroad, the *Bristol (Tenn.) News* states its effect to be "that the Memphis and Charleston road is cut from its eastern connections, and Mahone (the Virginia and Tennessee Railroad) from his western connections, thus destroying the through business of both lines, and converting them into mere local roads."

—The St. Louis and Fort Scott R. R. Co., is hereafter to be known as the Missouri Central Railway Co., the name having been changed at a meeting of the Board of Directors on Saturday last, when the following new Directors were chosen: Jacob R. Shepherd, Edward D. Butler, Wm. E. Herbert and Edmond H. Dewey, all of New York. Edward D. Butler was elected Treasurer, and Edmond H. Dewey, Secretary. A. W. Maupin remains as President of the company under the new organization.—*St. Louis Jour. Com.*

—The President has ordered the issue of the land patents due the Southern Pacific Railroad Company, the commissioners having reported that the second section of twenty miles, and the telegraph line, are completed.

THE GREAT RAILROAD CASE.

Decision of Chancellor Zabriskie.

THE INJUNCTION DENIED—THE DIRECTORS HAVE POWER TO LEASE.

TRENTON, N. J., October 18—Chancellor Zabriskie delivered, to-day, an opinion in the railroad lease case. The conclusions to which he arrived were, first, that the act of 1870 gave authority to the directors of the United Companies to connect with other roads; second, that their lines formed both connected and continuous lines with railroads in other States; third, all the property of the road and their appendages may be leased and operated without the consent of all the stockholders; fourth, the directors have such power by the consent of the State; such lease is within the power delegated by the Legislature to the directors; sixth, that the purposes of the lease are a public use; seventh, even if the directors have not the power to make the lease, the making of it is not a taking of property without compensation; eighth, that the Pennsylvania Railroad has power to consummate this lease. The injunction must be denied and the order restraining the defendants vacated.

The following is the opinion in full:

THE CHANCELLOR'S OPINION.

IN CHANCERY.—October Term, 1871.—Black and others agt. The United Companies of New Jersey.

The Chancellor—The complainants in this case are stockholders in the three corporations who are the defendants. The object of the bill is to restrain these corporations from executing a contemplated contract with the Pennsylvania Railroad Company, by which the works of the defendants are to be leased to that company for 999 years, for an annual rent of 10 per cent. on the amount of their capital stock. The matter before the Court is an application for a preliminary injunction.

The aggregate capital stock of the three defendants consists of 189,904 shares of \$100 each, of which the 21 complainants own 3,450 shares, being a little more than one fifty-fifth of the whole. The bill is filed for the benefit of the complainants and all other stockholders of the defendants who may join therein.

THE POWERS OF THE COMPANIES.

The defendants are the Delaware & Raritan Canal Company, the Camden & Amboy Railroad Company, and the New Jersey Railroad & Transportation Company, all incorporated by special charters, the first two by charters passed February 4, 1830. They were consolidated by an act passed February 15, 1831, and have since been commonly known by the appellation of the Joint Companies. In their business affairs and in legal proceedings the joint name was retained, and their affairs were managed by a joint board composed of the directors elected by each company according to its charter. The charter of the New Jersey Railroad Company was passed March 7, 1832, and it was consolidated with the joint companies, by virtue of an act of the Legislature authorizing it, passed February 27, 1867, confirming an agreement made on the first day of that month. By this they were only consolidated in interest, the stock and corporate existence of each remaining as before, but were governed by a joint board, composed of the directors of all. They have since been commonly known by the name of the United

Companies of New Jersey, but have not adopted or assumed a corporate name, for the consolidated companies, as authorized by the act. The canal company was authorized to construct a canal from the Delaware to the Raritan, and a feeder to supply it with water from the Delaware. The Camden & Amboy Railroad Company were authorized to construct a railroad from the Delaware, opposite Philadelphia, to Raritan bay, with steamboats at both extremities to convey passengers and freight from the city of New York to the city of Philadelphia, so as to "perfect a complete line of communication from Philadelphia to New York." It was authorized after the main was completed, to construct a lateral road from the main road to the Delaware at Bordentown. The New Jersey Railroad Company were authorized to construct a railroad from some point in the city of New Brunswick to the Hudson river, opposite the city of New York, with power to construct a branch to any ferry on that river opposite the city.

In the act of 1831, to consolidate the joint companies, it was provided that any stockholder of either, who dissented, should be paid back the price of his stock with interest—neither work being then constructed. And in the act of 1867, to consolidate the United Companies, it was provided that each dissenting stockholder should be paid the value of his stock, to be appraised by commissioners.

The joint companies, by an act passed March 15, 1837, were authorized to construct a railroad from the south-westerly end of the New Jersey Railroad in the city of New Brunswick to Trenton, and thence to connect with their road at, or south of, Bordentown, with a spur to the Trenton Delaware bridge. This act made no provision for dissenting stockholders. In 1835, the joint companies, by an agreement with the Trenton Delaware Bridge Company, of which they owned a majority of the stock, were allowed to lay rails upon the bridge over the Delaware, at Trenton, and to use it for their trains. And, in 1836, they made an agreement with the Philadelphia & Trenton Railroad Company, whose road ran from the west end of that bridge to Philadelphia, by which that road was used as part of the line of the joint companies to Philadelphia, and by which the clear profits of these three companies should be divided among all their stockholders, share and share alike.

The joint companies constructed a canal from the Delaware to the Hudson, a railroad from Camden through Bordentown to South Amboy, and provided steamboats at either end, to New York and Philadelphia, so as to make a complete line of communication from one city to the other, and also a railroad from the western extremity of the New Jersey Railroad in New Brunswick through Trenton to Bordentown, with a spur to the Trenton bridge, and laid rails on that bridge to connect with the Philadelphia & Trenton Railroad. The New Jersey Company constructed its road from the west boundary of New Brunswick to the Hudson at Jersey City near the ferry of the Jersey associates, but did not construct a branch to any other ferry. These works were all completed as required by the acts authorizing them.

In this manner, beside the canal from the Delaware to the Raritan, three complete lines of communication between New York and Philadelphia were perfected. One from New York to Amboy by steamboat, from Amboy to Camden by rail, and from Camden to Philadelphia by steamboat. The second from Jersey City through Newark and New Brunswick to Trenton, and over the Trenton bridge and

the Trenton & Philadelphia Railroad into Philadelphia. And the third by using the second to Trenton, then by the road from Trenton to Bordentown, and passing over the first thence to Philadelphia. Each of these lines was a continuous line from New York to Philadelphia.

Each of these companies had, with the authority of the Legislature, but without the express assent of its stockholders, varied and changed its located route, and constructed branches not authorized by its original charter. And had purchased stock of other corporations deemed auxiliary to its own, guaranteed their bonds and leased their works, each had established and maintained a ferry at the termination of its road over the Hudson and Delaware respectively, not for its own passengers merely, but for the public. And for this purpose the New Jersey Railroad Company had purchased, at the cost of nearly \$500,000, the capital stock of the Jersey Associates. These things were done sometimes with, sometimes without, special authority of the Legislature, always without the express assent of the stockholders.

LEASES, ETC., OF THE JOINT COMPANIES.

These lines were the only canal and railroad routes authorized by the State, by which passengers and freight coming to Philadelphia from the West could cross the State to New York. The Pennsylvania Railroad Company owns or controls the railroads which are the chief means of communication from the Western States, including California, to Philadelphia. This company made an agreement with the joint companies in 1863, by which freight and passengers coming over its road, and the roads controlled by that company to Philadelphia should be carried to New York over the roads of the joint companies without change of cars, and the fare and freight received should be divided according to distance passed over the respective lines.

The depot and other terminus accommodations at Jersey City, barely sufficient for the proper business of the United Companies, were found inadequate for the freight business from the West, which was coming over the Pennsylvania Railroad. The United Companies, to provide for this need, in the autumn of 1867, purchased of the owners the Harsimus cove property of Jersey City, extending from South Second street to South Seventh street, giving them a front of 1,300 feet on the Hudson, opposite New York, and containing about 70 acres. This purchase was made at the cost of near half a million of dollars, without any special authority from the Legislature, and without any express assent of the stockholders.

By virtue of an act approved March 30, 1838, the right of the State to the lands in this purchase, with the right of reclaiming lands under water was conveyed to the United Companies for the price of \$500,000. This act authorized them to construct a branch road from this property to the New Jersey Railroad at Bergen Hill. To this act the assent of the stockholders was not required or obtained. And, as is alleged, the United Companies have expended about \$600,000 in procuring the right of way for the branch so authorized by this act; and the improvement of this property for use will require several millions more.

By an agreement made between the joint companies and the Pennsylvania Railroad Company, in 1863, that company agreed to construct, and did construct, a railroad, called the Connecting road, from the Philadelphia &

Trenton Railroad at Frankford to its own road at Mantua. By this a continuous and connected line of railroad was completed from Jersey City to Pittsburgh, and further West, so that passengers and freight could be transported from Jersey City, and also from Amboy, in the same cars in which they were placed to Pittsburgh. The Pennsylvania Railroad has a branch road to the Delaware at the foot of Washington street, in Philadelphia, and the joint companies connect with it there by a ferry from the terminus of their railroad at Camden.

THE PROPOSED LEASE.

In this situation of their works, connections, and contracts, the defendants, jointly with the Philadelphia & Trenton Railroad Company, agreed with the Pennsylvania Railroad Company to enter into the proposed contract with that company. The terms of that contract had been settled and agreed upon, and the joint board of the directors of the United Companies has by resolution entered on its minutes directed its execution. By that contract, the canal, railroads, and all other property, real and personal, and the franchises of the United Companies, and the Philadelphia & Trenton Railroad Company, are leased to the Pennsylvania Railroad Company for 999 years, for the annual rent of \$1,948,500, being ten per cent, on the capital stock of the United Companies and the 4,946 shares of the capital stock of the Philadelphia & Trenton Railroad Company, not held by the joint companies, and so not represented by their capital. The lessee agrees to assume and perform all the duties, obligations, contracts, and liabilities of the lessors, and save them harmless from all existing or future claims. The lessors agree to furnish the lessee with 22,250 shares of their capital stock and mortgage bonds, on an executed mortgage for \$20,000,000, to the extent of about \$4,000,000 more than is required to pay their debts now maturing, such stock and excess of bonds to be used in the improvement and development of Harsimus cove, and to be advanced in installments after the amount of the installment has been expended. The lessee is to keep the works in repair, and the contract contains a clause for re-entry upon non-performance of any stipulation by the lessee, and that thereupon its estate and interest shall cease and be void. An act approved March 17, 1870, is relied on as giving power to make this contract.

The act of 1870 declares "that it shall be lawful for the United Companies, by and with the consent of two-thirds of the stockholders of each, to consolidate their respective capital stocks, or to consolidate with any other railroad, or canal company or companies, in this State or otherwise, with which they are or may be identified in interest, or whose works shall form with their own connected or continuous lines; or to make such other arrangements for connection or consolidation of business with any such company or companies by agreement, contract, lease, or otherwise, as to the directors of said United Companies shall seem expedient." It provided that any stockholder who should be dissatisfied with such arrangements, and should give notice of his dissatisfaction within three months after it should be made, should be paid the full value of his stock, to be appraised by commissioners appointed for the purpose.

To entitle a party to protection by injunction, it must clearly appear that he has some right which is about to be violated, as well as that the threatened injury is irreparable or can not be adequately compensated for by

suits in the law courts. The right of the complainants claimed here is the right to have the works of the defendants remain under the present management, without being leased or transferred to any person or corporation at a fixed rent, instead of the possible profits to be made by the management of directors. The right of the complainants to their stock is not disputed. The only question is whether this gives them the right to control the action of the directors and the majority of the stockholders in such disposition of the works and franchises. It is contended that the act of 1870 does not authorize this lease, and that if it gives any authority in this case this lease extends to objects not within it.

It may be considered as settled that a corporation can not lease or alien any franchise, or any property necessary to perform its obligations and duties to the State, without legislative authority.

Beman vs Rufford, 1 Sim, N. S. 550; Johnson vs Shrewsbury & Pa. R. R. Co., 3 De Gex, McN. & G. 914; Shrewsbury & Birmingham R. Co. vs North-western R. Co., 6 H. L. C. 131; South Yorkshire R. Co. vs Gr. North-western R. R. Co., 3 De Gex, McN. & G. 576; Michigan & Birkenhead R. Co., 5 De Gex & Sn. 562; Great Midland R. Co. vs Eastern Counties R. Co., 9 Hare, 306; Troy & Rutland R. R. vs Kerr, 14 Barb 601; Ohio & Miss. R. R. vs Ind. & Cin. R. R., 14 Am Law Reg. 733; Lanman vs Leh Vall R. R., 6 Casey, 42 York & Md R. R. vs Winans, 17 How. 39; Com. vs Smith, 10 Allen, 455; Richards vs Libby, 11 Allen, 66.

This rule is founded on reason and principle, the franchises granted by the State are often parts of the sovereign power delegated to a subject, and always privileges to which other citizens are not entitled. In these grants the State is supposed to regard the character of the grantee, or the guards and restrictions placed upon the corporation, when the grant is by a charter to persons continually changing it by transfer of stock. In this case the franchise of maintaining a canal and railroads across public highways and navigable rivers, of taking tolls and rates of fare fixed by themselves without control, are with others a material part of the property leased; these can not be leased or aliened without consent of the State.

THE LAW ON CONSOLIDATION OF STOCK

The act of 1870 clearly grants the power to the United Companies to consolidate their own capital stocks, and to consolidate their stocks or business with any other connecting railroad in the State; but it is contended that it does not authorize such consolidation or connection of business with any corporation of another State. The question depends upon the meaning and effect of the word "otherwise." This is certainly an inapt word to designate companies out of the State by being placed in opposition to the words "in this State." It is inapt, because its proper use is to express difference of means or manner, and not of place. The word is used here in a way that admits of no change of place in the sentence, even if such change can ever be permitted. "Companies in this State" are one subject of the provision, the word or plainly denotes that some other subject is to be indicated. If the word elsewhere or otherwise had been used, it would have appropriately expressed the meaning intended. The radical meaning of the word *otherwise*, which is always a relative word, is different from that to which it relates; and the phrase to which it relates in this case, both from location and the sense, is clearly the words "in this State."

It means companies different from or other than companies in this State. This is the meaning that I think would strike every one upon the first reading of the sentence; but any one conversant with the correct use of language would be struck with the inappropriateness of this word to express the meaning. It is a case of bad grammar, and not of doubtful meaning. The maxim "*mala grammatica non vitiant chartam*," applies to statutes as well as to deeds. If a statute provided, "That if any father or mother should chastise a child so as to maim it, he or *her* so doing should be guilty of felony," a guilty mother would hardly escape on the ground that the word *her*, by which alone she was included, could not be applied to "he guilty," because the rules of grammatical construction and the settled use of language forbid it. Something was intended by the use of this word, and a settled rule of construction requires that no part of a statute shall be disregarded if any effect can be given to it. Den. vs Duhois, 1 Harr. 293. And where the intention of the Legislature is plain, the words of the statute must be construed according to that intention. No one can read this statute, either in a cursory manner or with deliberation and repeated reading, without being convinced that such was the intention, and that the words used express it, although awkwardly, inappropriately and ungrammatically.

It is a rule of construction that all grants from the State, and grants of franchises and exemptions in charters, must be construed strictly and most strongly in favor of the public, and against the grant. The object is to protect the public against improvident grants, and grants made by implications without clear intention. And such grant will not be sustained by doubtful words. Ambiguity in such grant vitiates it. But this rule is qualified by another—that such grant and the statute making it must receive a reasonable construction, and not be so construed as to defeat the intention of the Legislature, and that the ambiguity must be such as is not removed by the settled rules of construction.

1 Sedgw. on Stat. 259 and 327; 3 Dutch. 523, State vs Newark; 3 Dutch. 76, Wright vs Carter; 2 Zthr. 614, Briggs case; Bridge Proprietors vs Hoboken, 2 Beas. 81; Del. & Rar Canal Co. vs Rar. & Del. B. R. Co., 1 C. E. Green, 372; Richmond R. R. Co. vs Louisa R. R. Co., 13 How. 81; Perrine vs Ches. & Del. Canal Co., 9 How. 172; Pennock vs Coe, 23 How. 132; Rice vs Railroad Co., 1 Black, 380; Phil. & Erie R. R. Co. vs Catawissa R. R. Co., 53 Penn. 62 and 68.

This act can hardly be considered a grant from the State, or to fall within the reason of the rule requiring strict construction in all such grants. The State here parts with no property, and creates no new privilege or franchise that can affect the public. It simply permits a new arrangement of contract as to privilege and franchises already granted. It enlarges none. It clearly allows such arrangement with companies in this State, and the only question is whether it shall be allowed with like companies of another State.

IS THE PENNSYLVANIA COMPANY WITHIN THE ACT?

It is also urged that the Pennsylvania company is not within the purview of the act; because their works do not form connected or continuous lines with the works of the defendants. I think that the lines are both continuous and connected. The works of the Camden & Amboy Railroad Company extend from New York to Philadelphia. It was so held in the Briggs case, 2 Zthr. 623, and the Delaware & Raritan Canal Company agt. the Rari-

tan & Delaware Bay Railroad Company, 1 C. E. Green, 531, and 3 do, 546. They extend to the foot of Washington street at Philadelphia to the railroad of the Pennsylvania Railroad Company. Thus their works, though not their railroads, form a continuous line. The road of the Camden & Amboy company at Trenton is connected at Trenton, is connected by three intervening roads with the Pennsylvania Railroad. They are not continuous; that implies without interval or interruption. Railroads can be connected either directly or by intervening roads. The provisions of the acts of Pennsylvania show this; their phrase is, "connected directly or by intervening roads." In either way they are connected, if directly connected they are also continuous. And the fact that this act uses the word connected after continuous, for the obvious purpose of adding something to the extent of the provision, shows that the intention was to include roads connected not directly, but by some intervening or connecting road.

THE LEASE NOT A SALE.

It is also urged that the means proposed are beyond the powers in the statute; that the authority is to lease, but that the proposed lease for 999 years is, in reality and substance, a sale, though in name a lease. This term is, no doubt, practically equivalent to a fee, but it differs radically from a sale, because it is for rent reserved during the term, with power of re entry. The distinguishing feature of a sale is that it is for a consideration paid, and extinguishes all rights to the property. This is in substance as well as in form a lease. The act of 1870 is, in my opinion, authority by the State to make the proposed contract and lease. The complainants further insist that even if the act authorizes the making of this contract, as far as the State is concerned, yet that against them it is invalid, as it impairs the obligation of a contract existing between them and the defendants, arising out of the charters and their subscription to the stock: this contract they claim to be, that the roads and canal shall be maintained and operated by directors chosen by the stockholders for their benefit, and the whole net profits divided among them as dividends; and that this contract continues without limit of time, unless every stockholder shall consent to change or terminate it. It is settled that a charter without reservation of the power of repeal is a contract between the State and the corporations, which can not be altered without their consent. It is also settled by many decisions that a corporation can not use the capital stock of the company for any enterprise substantially different from that authorized by the charter, as the stock is subscribed and paid in for that purpose, and that only, which raises a contract not to apply it to any other; and that when persons enter into partnership or become incorporated for a specified object or business, and the articles or charter stipulate that the business is to be continued for a time specified, that the business can not be abandoned within that time except by the consent of all the partners or stockholders.

See *Zabriskie vs Hack. & N. Y. R. R. Co.*, 3 C. E. Green, 178, and the authorities there cited.

There is no case that holds that a majority of corporations where a time is not specified for which the enterprise must be continued, may not abandon the enterprise, and sell out the property of the company. The dictum of Parker, Master, in *Kean agt. Johnston*, 1 Stockt. 413, is the only authority which I find in support of the doctrine. The dictum in my own opinion in *Zabriskie vs the Hack. R. R.*

Co., 3 C. E. Green, 193, that a single stockholder can prevent all others from changing or abandoning the work, must be taken with the qualification annexed to it in the former part of that opinion, p. 183—that is, "where they become members of a corporation for definite purposes, specified in their charter, and for a time settled by it." The case of *Natusch agt. Irving*, cited in *Kean vs Johnston*, does not support the position. The complainant there held a life policy in a life insurance company, by which he became a member. This was a contract that the company should continue until his death. Lord Eldon held that they could not add marine insurance to the business against his will while the partnership continued, nor compel him to retire, by indemnifying him or by valuing his policy and paying it off. Nor does the opinion of Chancellor Kent, in *Livingstone vs Lynch*, 4 J. C. R. 573, sustain it. There the partnership was stipulated to continue as long as Fulton's exclusive right continued, and it was held that a majority could not change the essential provisions of the articles of partnership. Gough and Angell, in the section referred to, and Binney's case, 3 Bland, ch. 142, simply state that there is little doubt that a court of equity, in a proper case made, would restrain the disposition of the property of a corporation for other than corporate purposes. This refers to a disposition of the whole property, during the continuance of a corporation, and not to an abandonment of the enterprise by the vote of a majority. The reasoning of all these authorities is based upon the law of partnership; by that law, when there is no definite time fixed for the duration of a partnership, it is a partnership at will, and may be ended by any partner at his will.

Story on Partnership, §269 and 370, Collin B. r. ch. 2, §2. And this was the doctrine of the civil law. Pothier Pand. Lib. 17, tit. v. n. 64; 1 Domat Civ. Law, §802 and 803.

Becoming incorporated for a specified object without any specified time for the continuance of the business is no contract to continue it forever, any more than articles of partnership without stipulation as to time. There is no reason why it should be construed into such a contract. Such is not implied by the charter. And a doctrine that all the stockholders but one may be compelled to continue a business which they find undesirable and unprofitable, and wish to abandon, is so unreasonable, and unjust, that it will not be held to arise by implication, unless that implication is a necessary one.

The Supreme Court of Pennsylvania held, in *Lauman vs the Lebanon Valley R. R. Co.* (30 Penn. C. Casey, 142), that private corporations can, by a vote of the majority, abandon their enterprise, and sell their property, and that such sale violates no contract. In their opinion they say, "If there has been any thing in the relation existing between the corporation and its members that prevents a sale, then a more serious difficulty is presented. For if there is, it must be a part of the contract of association, and can not be changed by the Legislature. But is there?"

"The charter contains the terms of the contract, and in it we discover no provision of this kind. Can we regard it as implied or involved in the nature of such a contract? We do not think so, for property in itself is essentially alienable, and the right of alienation is essential to complete ownership.

VOICE OF A DISSENTING STOCKHOLDER.

The Court further hold that a dissenting stockholder can not be forced into a new en-

terprise, or to take, as compensation for his shares, stock in a new company, or a company into which the old one is consolidated. They hold that there are two contracts, one with the Legislature, which it can dispense with, the other between the stockholders, as to what object they will enter into, and that this can not be altered by the Legislature. They say, "It is the nature of his contract with his associates by which, under legislative authority, they constituted themselves into a corporation, that it is dissoluble, and that upon its dissolution the rights and property shall be distributed among the members;" and again, "a railway corporation may by legislative consent abandon its franchises as conservators of a highway."

In that case the Legislature had omitted to provide any compensation for shareholders, except the stock of the new company, supposing the change so beneficial that none would dissent. Yet the Court held that the change might be made by the directors, upon giving security to dissenting stockholders, to pay them the value of their stock, to be appraised by commissioners.

In *Gatz vs Pennsylvania Railroad Company*, and *Sunbury & Erie Railroad Company*, in the same court, the complainant, who was a stockholder in both companies, applied for an injunction against the lease of the road and franchises of one company to the other for nine hundred and ninety nine years, a lease authorized by the Legislature. The Court held that both corporations had the power without the consent of all the stockholders.

In the *Commonwealth vs Atlantic & Great Western Railroad Company*, 3 F. R. Smith (53 Penn. R.) 9, on an information by the Attorney General in nature of *quo warranto*, the same court held that a corporation created by consolidating two corporations of New York with one of Ohio and one of Pennsylvania into a new corporation, with the consent of two-thirds of the stockholders of each, according to the provisions of a statute of Pennsylvania, constituted a lawful corporation.

In *Treadwell vs Salisbury Man. Co.*, 7 Gray, 393, it was held by the Supreme Court of Massachusetts that a private incorporation, by a vote of the majority, may abandon the business of the corporation and sell out their property. The doubt expressed whether a corporation, for a quasi public purpose could do this, and whether the State by *mandamus* could not compel them to continue their business, does not apply to a case where the State has authorized it.

Such a radical change as the abandonment of business can not generally be effected by directors; their duty in most charters is to manage and conduct the business. It requires the action of the corporations themselves. In corporations where there is no provision to the contrary in the charter, the rule is that the majority governs. The assent of all is therefore not required. Grant on Corp. 63, A. and A. sec. 499.

The Legislature as sovereign can prescribe laws which shall govern corporations where there is no contract in their charters to exempt them, it can direct that a majority of members or two-thirds in interest shall control. If it can do this by general law it can by special act. The act of 1870 does that in this case.

[Continued in next number.]

The Hartford Tunnel.

The new Hartford tunnel for the Hartford and New Haven Railroad, is nearly completed. The enlargement of the old tunnel was made through an exceedingly troublesome strata of quicksand and clay, which had a tendency to cave in, and thus seriously impeded the operation of excavating and pile driving, which was carried on at the same time. The tunnel passes under two busy streets, one having a horse railroad track, and both having gas pipe, aqueduct pipe, etc., all of which had to be moved and removed, so as not to discommode the public. Trains passed upon the road itself on an average every five minutes during the day a fact which necessitated considerable calculation. The number of piles driven was 1731, or measuring the part actually under ground, seven miles. The work was under the immediate supervision of E. M. Read, superintendent of the Hartford and New Haven Railroad, who is a practical and efficient engineer.

Corporations have no Souls!

This is a trite old saying, and as a general thing is no doubt true; but, nevertheless, they sometimes give indications that although they may have "no souls" yet they have "bowels of compassion" that "move" most hugely and efficiently. The following from the Cleveland *Herald* fully sustains this view:

"It is pleasant to state that the road has borne cheerfully the brunt of the immense task of carrying away, free of charge, the throng of homeless sufferers who lost their all in the fire. In this work, and in transporting gratis the supplies sent to Chicago, the Lake Shore managers have rendered services to the value of \$150,000, and are entitled to the credit of having bestowed charity to that amount. The value of these services will be above rather than under \$200,000 before the work is finished."

—The earnings of the St. Louis & Iron Mountain Railroad for the third week in Oct. are as follows:

1871	\$46,074 00
1870	31,240 58

Increase	\$14,833 42
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Earnings Jan. 1 to Oct. 23, '71	\$1,276,411 15
Earnings Jan. 1 to Oct. 23, '70	1,077,468 04

Increase, 1871	\$198,943 11
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PURCHASES AND TRANSFERS OF TENNESSEE RAILROADS.—The following transfers are reported: The Knoxville and Kentucky Railroad, to W. B. Johnson & Co., representing the lessees of the Western and Atlantic Railroad and the Pennsylvania Central, for \$350,000. The Cincinnati, Cumberland Gap and Charleston, to the East Tennessee, Virginia and Georgia Company, for \$300,000. The Nashville and Chattanooga Railroad Company, purchased from the Railroad Commissioners, the Nashville and Northwestern Railroad, leading from Nashville to Hickman, Ky. The Pennsylvania Central Company have purchased 10,000 shares in the East Tennessee, Virginia and Georgia Railroad, for the sum of \$1,000,000—being the par value of the stock.

RAILWAY AID IN MICHIGAN.—The decision of the Supreme Court in the Bay City R. R. Aid case, granting a mandamus ordering the State Treasurer to return to that city the bonds voted and issued to aid in the construction of the Jackson, Lansing and Sag R. R. is a most important one. If this precedent governs all similar cases, says the *Detroit Post*, the bonds now on deposit in the State Treasury may, and, probably will be, recovered by the corporation which issued them, and destroyed, thus annulling the chief evidence of the debt so intended to have been incurred.

—The *St. Joseph Gazette*, in alluding to the railroad prospects of that city, says: "The St. Louis and St. Joseph road has recently passed into the control of the Pennsylvania Central Railroad Company, the most powerful corporation in the United States, and will be put in first-class condition at once, and run in connection with the Ohio and Mississippi Railroad, and compete at this point for business with the New York Central or its tributaries."

—Articles of consolidation between the Chicago and Canada Southern Railway Company and the Southeastern Michigan Railway Company were filed at Columbus on the 30th ult. The capital of the consolidated company is ten millions of dollars, and the road will be called the Chicago and Canada Southern Railway. The termini are Chicago and a point on the eastern boundary of Wayne county, Michigan, on the Detroit river, running through Williams and Fulton counties, Ohio.

—It is stated that General Mahone has been successful in effecting a loan for the Atlantic, Mississippi and Ohio Railroad Company to the amount of \$15,000,000, and the deed of mortgage involved has been duly recorded in Norfolk county, Va., the State tax upon which was \$15,000.—*American Railroad Journal*.

—The Milwaukee *Wisconsin* says that a sufficient amount of iron has been purchased for the Green Bay and Lake Pepin Railroad to lay forty miles of track. The first gauge is expected to reach Chicago by the 20th inst. The completion of this important thoroughfare is thus assured.

—The Bayfield *Press* says a "company of capitalists of New York city, with E. G. Roberts as President, has bought the old road bed on the line of the Hudson and Superior road, and will lay twenty miles of iron from Hudson to New Richmond this season."

—The Baltimore and Potomac Railroad Company has begun to grade for their track in Virginia avenue, Washington, and will soon begin to lay the rails.

—The Denver and Rio Grande Railway was finished to Colorado Springs, 76 miles, on the 23d inst., and is now open for travel and freight. The gauge of the road is three feet. Surveys are now in progress to Santa Fe and St. Louis Valley.

—A. Campbell, the printing press builder, has constructed a machine with which it is impossible to print without register, and which will not make an impression if the sheet be not properly fed. The operation is governed by an electric apparatus in connection with the "points."

UTILIZING COAL SLACK.—The enormous piles of slack or waste coal lying contiguous to the Westmoreland Coal Company's mines are to be utilized at last and turned into coke. The Messrs. Carnegie, of Pittsburg, and others, are constructing coke ovens along the Pennsylvania Railroad for this purpose, and it is said they will be successful, having a process for desulphurizing the fine coal. The sulphur has heretofore prevented coke being made from the Westmoreland coal. There are upwards of 900 coke ovens along the Pittsburg & Connellsville road, and the Uniontown and Bradford and Mount Pleasant branch roads, and nearly 400 additional ones are being constructed. Some idea of the tonnage can be formed, when it is known that the production largely exceeds 100,000 bushels, or about 5,000 tons of coke per day, and falls far short of the demand.—*Protectionist*

A little common salt, with the help of steam bath, will desulphurize coal, and is no doubt the cheapest method of doing it

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EXTINGUISHER.

Cheapest and Best Protection
AGAINST FIRE.



Puts Out Burning Kerosene,
BENZINE, TAR, ETC.

Insurance Companies Reduce Rates
Where it is Introduced.

The attention of Practical Railroad Men is earnestly invited to the record of work done, and to the fact that nine-tenths of the fires that kindle at stations, in wood piles, and on trains are within the power of this Machine when discovered

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RAILROAD RECORD OFFICE,

No. 167 Walnut Street, Cincinnati, Ohio.

The Railroad Record.

E. D. MANSFIELD, - - - - - } Editors
T. WRIGHTSON, - - - - - }
A. J. HODDER, - - - - - }

CINCINNATI THURSDAY, NOVEMBER 23, 1871.

The Railroad Record,

PUBLISHED EVERY THURSDAY MORNING,

By Wrightson & Co.,

OFFICE—No. 167 Walnut Street

SUBSCRIPTIONS—\$3 per annum in advance.

ADVERTISEMENTS.

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The Kentucky & Great Eastern Railroad in regard to the Coal Supply.

In the calculations and estimates (recently published in the RECORD), respecting the Great Eastern Railroad, the basis was the materials for business furnished by the counties through which the road passes, considering the work as a whole, as for example, the Erie road, or the Atlantic & Great Western. But it is evident that the time is near, if not now, when the great coal supply of Cincinnati must be by rail, and equally evident that the road of lowest grades must do the business. In this light, that part of the Great Eastern which lies in Kentucky will have superior advantages, for there can be only two routes which come from the coal deposits to Cincinnati without considerable grades. These are the banks of the Ohio river on the Ohio and Kentucky sides. Good coal banks are on the Ohio side, from 150 to 200 miles; on the Kentucky side they are from 120 to 150 miles. The Kentucky side has, therefore, decidedly the advantage. By referring to the Geological Survey of Kentucky, published in 1856, we find that there are abundant coal mines in Greenup county, Kentucky, which are not more than 120 miles from Cincinnati. On the Ohio (river) side, good available coal mines are much farther. Besides this, the crossing of the Scioto river must be very expensive, an expense which is not necessary on the Kentucky side. Farther, besides all this, there is not the least prospect that any railroad will be made on the Ohio side. The Ohio Constitution of 1850 has made it utterly

impossible for any county or town to help itself in any way whatever. A few private subscriptions may be obtained, but they amount to very little, and, as it now seems, no road will be made on the Ohio side. If that be so, then the coal road to Cincinnati must be made on the Kentucky side, and on the banks of the Ohio river. We understand from the surveys of the Great Eastern Railroad that there is almost literally no grades from Catlettsburg, Boyd county, to Cincinnati. At any rate they are very small. The result of this is, that coal can be brought from Greenup county, Kentucky, or from beyond to the Kanawha, on a large scale, for not much more than half what it can be transported for on the Ohio side, and this is a matter of certainty, not of guess or fancy. Of course, in saying this we except a road, if any such there be, made on the north bank of the Ohio. But, even then, the road on the Kentucky side being the cheapest, the coal can be carried the cheapest. If we are right, then, in assuming that coal must be carried in future by rail, the most advantageous route will be on the Kentucky side by the Great Eastern, that is clear.

But there are two prior questions: 1. Can any railroad compete with the Ohio river in the carriage of coal? 2. Will the demand be enough to give work and profit to a railroad? We shall answer these questions briefly and conclusively.

A little reference to the history of railroads will illustrate this subject. When railroads were first introduced, much discussion was had among engineers and intelligent men, and various opinions expressed: but it was almost universally agreed that railroads could not carry heavy freight of any kind. A railroad, it was thought, could (on the main lines) be made available and profitable for passengers and light goods, such as valuable dry goods, but not for carrying heavy freights, such as flour, iron, coal, &c. They must be carried by water. In a few years, however, railroads began to carry some heavy freights, such as flour and provisions, but only on lines where the transportation was very great. Some years passed, and the Baltimore & Ohio road was completed to Cumberland. There it had access to valuable coal mines, and soon began to carry coal. At this time it encountered the competition of the Chesapeake & Ohio canal. But the canal was unable successfully to compete with the railroad, and the fact was established that railroads could carry coal profitably. But the experience of the last few years has tested the whole question of carrying heavy freights. The simple fact is, that to-day the receipts from freights are two and a half times as much as for passengers. In fact, the receipts from heavy freights are now so large, that the passenger business is of secondary importance.

We come, then, to the question: Can the railroad compete successfully with the Ohio

river? We answer, without hesitation, that the railroad can not only compete with the Ohio river, but will divert the coal business from the river. This will be obvious from the consideration of certain plain facts. 1. Coal can only be carried on the Ohio river at certain seasons, not being half the year. The consequence is, that in the intervals, sometimes three or four months, the railroad can accumulate the coal at Cincinnati, and forestall and command the market. 2. All the coal brought by the river must be handled at the boats and put into carts. This handling is expensive, and makes a large profit. By the railroad this is not necessary. The coal can be dumped into the cars at the mines and dumped out again into the elevator, with comparatively little handling. 3. The losses in coal boats are, in the course of a year, very large, and by the railroad none. If the railroad be properly prepared for a coal business it can carry coal from Greenup county, Kentucky, to Cincinnati, for less than it is carried on the river, taking all the year round.

2. Will there be sufficient demand? Where will the demand stop? In 1870 there were brought into Cincinnati 22,000,000 bushels of coal, and the demand had increased from year to year much faster than the increase of population. But when the supply becomes cheap and uniform, it will not be Cincinnati only but the whole surrounding country which will receive coal supplies by rail. Half a million of people will want coal, and they will want at least 60,000,000 bushels per annum. From 1862 to 1870, eight years, the tonnage of coal on the Reading Railroad increased from 2,200,000 tons to 4,200,000 tons. This makes the enormous amount of one hundred and twenty millions of bushels of coal carried on the Reading Railroad. This single example shows in the most striking manner the adaptation of railroads to carry coal.

We come, then, to this conclusion, that the coal supply of Cincinnati will be carried on the banks of the Ohio river, by rail, and that the Great Eastern has a fair prospect of being the road to do it.

KENTUCKY CENTRAL RAILROAD.—The heavy and long continued contest for the ownership of this road has just culminated before the Kentucky Court of Appeals. If we had room we would like to give the very able arguments of the learned counsel on both sides. But lack of space compels us to omit it. We purpose to give the final decision of the Court.

Church's Musical Visitor for November is on our table and comes to us like a honey bee, well laden with sweet things.

A RAILWAY TUNNEL IN RICHMOND.—The city council of Richmond, Va., on the 16th inst., appropriated \$200,000 for the purpose of tunneling Church Hill in that city, for the extension of the eastern terminus of the Chesapeake & Ohio Railroad to tide water on the James river.

Eggleston Avenue and the Railroad Imbroglio solved.

We believe that all the parties to the railroad controversy before the Council are honest and are earnest in their respective opinions. We believe, farther, that a settlement can very easily be made, without impairing or sacrificing anybody's rights or interests. We will briefly state our views.

1. If the State of Ohio granted the right of the canal (which is the basis of Eggleston avenue) for the purpose of a street or avenue, and such we believe is the fact, then we hold the city has no right to vacate it as a street or avenue; nor does the property in the Miami canal revert to the Pennsylvania road. They have no right in or over the Miami canal. But as this is a law question, we prefer not to decide it. The parties have law counsel, let them settle it for themselves.

2. We hold that no railroad company, coming from the Kentucky side, and carrying coal to Cincinnati, will ever use the clumsy and almost impossible contrivance made by the Pennsylvania company and proposed to the Council. With a curve almost as short as a right angle, with a grade down like the side of a roof, and a Y on Front street, the thing is simply absurd, if not impossible. No plan yet proposed to the Council is a practicable one. We admit all of them are possible, but practically they never can be profitable. What, then, can be done? We think the whole matter is reconcilable with the interests and policy of all parties.

If the city of Cincinnati has the power (which we don't believe) to vacate Eggleston avenue, then let it make what arrangements it pleases with the Pennsylvania Railroad, on these conditions, viz:

2. The floor of the bridge is 103 feet above low water mark. Now, Front street is from 52 to 60 feet above low water mark. The bridge is therefore from 40 to 50 feet above Front street, and the whole of the bottom of Cincinnati. What follows? That the Kentucky & Great Eastern, the Cincinnati Southern, or any road from the Kentucky side, may pass over any depot the Pennsylvania road may make without any injury or obstruction to it. Why should not this be done? Does it not settle all the difficulties at once? Why should the Pennsylvania road expect to compel another road, in which it has no interest, to come down its crooked and steep track for no purpose but to go up again? There is neither reason nor policy in it. A railroad track only 20 feet broad and 40 feet above the depot would not in any way interfere with the depot or hotel of the Pennsylvania road. Then there is an easy solution of the matter. If the city feels disposed to give up Eggleston avenue to the Pennsylvania company, let them provide explicitly, that any other railroad company using the bridge shall have the right to cross from the bridge to Pearl street at a

height of not less than 40 or 50 feet from the ground.

This will obviate all difficulties, and the Kentucky & Great Eastern and Cincinnati Southern can come into Cincinnati easier than any other railroads can. They will come in on a level with the bridge, cross Pearl street on trestles, and go on nearly a level into the Tunnel. This would enable the Kentucky & Great Eastern to supply Cincinnati with cheap coal, and solve all these problems peaceably.

Kentucky & Great Eastern Railway.

THE CANVASS IN KENTUCKY.

The canvass going on in the State of Kentucky is one of great interest not only to the people of that State, but especially so to Cincinnati, as well as to the whole West. The assurance of the construction of this important line of railway, saving 100 miles of transit on all traffic between the East and West, is a matter of the utmost importance and worthy of every effort to secure so important a result.

The construction of a railway, although apparently a local measure, is often as in the case of the Kentucky & Great Eastern Railway one of National importance. And while the canvass waxes warm in the river counties of Kentucky, we assure the friends of the measure that their progress is watched with much anxiety outside of their State, and their success will be hailed with joy as an indication not only that Kentucky is to be redeemed from lethargy, but that she is determined to assume her true position in the march of progress.

To show the spirit of the canvass, that it has the true ring of common sense and enlightened intelligence, we make the following extracts from the Maysville *Eagle*:

Let the farmer take the trouble to consider the question for a moment, and he will see that what we say is the case. It is 65 miles from Maysville to Cincinnati, and from Vanceburg it is 95. From Cincinnati to New York city is by the shortest of the existing roads 746 miles, and by the longest fully 880. From Cincinnati to New York by the proposed line of the Kentucky & Great Eastern it is but 640 miles, from Maysville 582 and from Vanceburg 550. Since all or very nearly all of our shipments of stock, grain and other produce are made to New York by way of Cincinnati, the construction of the Kentucky & Great Eastern Railroad practically will save us at Maysville 65 miles of transportation by river and 164 by rail over the shortest of the existing routes; and at Vanceburg, 95 miles by river, and 196 by rail, over the same route. The building of the road will save us also the cost of rehandling in Cincinnati, and the profits of the commission merchant there. All of this is equal to at least twelve cents on every bushel of grain raised in the counties of Mason and Lewis, and a proportionate sum on all the stock raised in the counties. This saving on the transportation is actually so much added to the value of the stock while it is still in the hands of the farmer. Of course

the price of driving the stock from Tollesboro to Maysville or to Vanceburg, or of hauling grain to either of the points, will not be diminished one cent by the construction of the road, but the saving on all shipments from those points will be the same, whether the grain and stock may be raised at Tollesboro or in Wilson's Bottom. The saving in transportation from any point on the road to New York will be the same to the farmer living at a distance of ten miles and driving to it and to the farmer living immediately adjacent. This is so clear that the man who runs may read. The price of wheat, corn, beef, hogs, of any other article of farm produce at Cincinnati is governed by the price in New York, and the price in Cincinnati in turn governs that of Maysville and Vanceburg. The price in Vanceburg or Maysville is always exactly the same that it is in New York, less the profits of the commission merchants in Maysville and Cincinnati, less the cost of shipping to Cincinnati by water, of rehandling there and then shipping to New York by rail. Give facilities for shipping direct to New York and do away with the necessity for the intervention of the Cincinnati broker, and lessen the price of transportation by shortening the distance, and you add to the value of all your productions in the Vanceburg and Maysville markets just to that extent.

The *Ashland Journal* says: "The closer we scrutinize the Kentucky & Great Eastern Railway project, soon to be submitted to a vote of our people, the plainer we see its advantages to us. The question as it is: to be submitted embodies all the features of fairness any people could ask."

The *Catlettsburg Herald* says: "Our town was visited last week by Col. HODDER, vice president of this road, who was very much surprised at the action of our county judge in refusing to submit his proposition to the people. Judge REID, of Greerup county, has taken a similar stand, thus showing his unwillingness to risk his constituents with so grand an issue. He must, in common with our judge, bank largely on the ignorance of the people. The judge of Lewis, willing to risk the people, has ordered the vote in that county, which will be taken on the second day of December, on which occasion old Lewis will roll up a handsome majority in favor of progress and improvement."

The *Maysville Bulletin* says: "The people of Lewis county living upon the head of Kineconick, and between that and the head waters of Salt Lick, were very much excited last week over the discovery of a thick vein of excellent coal. It is said to be of superior quality and seven feet in depth. If this is true, it is a most valuable discovery, and will attract immediate attention of enterprising men to that region of country. It is only about eight miles from Mt. Carmel and twenty-four miles from Maysville."

Lewis county abounds with many valuable resources which only need capital and enterprise for their development. The Kentucky & Great Eastern Railroad will run forty miles through her territory upon the river bank, and afford an outlet for her exports to any part of the country."

There is not a paper on the line of the road, or in the State of Kentucky that we know of, that is not outspoken in favor of the construction of this road. Such unanimity is not often the good fortune of new enterprises.

Chesapeake & Ohio R. R.

Col. Wm. H. Trimble, of Hillsboro, Ohio, gave the following interesting table of distances, in his recent address to the people along the line of the projected Southern Ohio Railroad:

From Chicago to Richmond.....	796 miles.
From both Dayton and Cincinnati to Richmond.....	543 miles.
From Wilmington to Richmond.....	512 "
From Hillsborough to Richmond.....	492 "
From Piketon (on Scioto) to Rich.....	436 "

The distances are of measured lines and running roads—allowing for proposed cut-off line in Virginia, saving 27 miles of distance.

Distance from both Dayton and Cincinnati to Jackson (an important center for both coal and iron distribution).....

From Wilmington to Jackson.....	78	"
From Hillsborough to Jackson	58	"
From Piketon to Jackson	22	"
By Marietta & Cincinnati R. R. from Cincinnati to Jackson.....	142	"

By Marietta & Cincinnati R. R. from Hillsboro to Jackson.....

120 miles.

By S. O. R. R. from Dayton to the field of black coal descri'd above.....

113 miles.

From Dayton to Symmes Creek field.....

122 "

From Chicago by Dayton to Wash-

ington City.....

816 miles.

From both Dayton and Cincinnati

to Washington City.....

563 miles.

From Wilmington to Washington.....

533 miles.

This line, when at Dayton, will also be on

From Hillsboro to Washington.....

511 miles.

the shortest line from Quincy, Ill., to tide wa-

ter and to Washington.

The shortest distances by any other line,

either to tide-water or Washington City, are

by the B. & O. road, as follows:

From Cincinnati to Baltimore.....

588 miles.

By running road from Baltimore to

Pittsburg, and projected line

thence to Chicago, distance from

Chicago to Baltimore.....

795 miles.

By same road and projected line

thence to Chicago, from Chicago

to Washington City.....

835 miles.

IMPORTANT RAILROAD INCORPORATED.—The

certificate of the Southern Ohio Railroad to

be built from the mouth of Symmes Creek,

Lawrence county, to Hillsborough and

Dayton, was filed at Columbus, Novem-

ber 14, with \$3,000,000 capital. The road

is to pass through the counties of Law-

rence, Gallia, Jackson, Pike, Highland, Clin-

ton, Warren, Greene and Montgomery. A

certificate was also filed incorporating the

Hillsboro and Cincinnati Railroad Company,

with \$1,500,000 capital. This road is to be

built from Cincinnati to Hillsboro, passing

through Hamilton, Clermont, Brown and

Highland. Both roads are intended as out-

lets for the Ohio and Chesapeake Railroad at

its western terminus, at Huntington, West

Virginia.

— At the annual meeting of the Baltimore

& Ohio Railroad, on the 21st inst., the old

board of directors was re-elected, the only

change being the election of John King, jr.,

to fill the place of the late Albert Schumacher.

The annual report shows that the revenues of

the road and its branches, for the fiscal year,

were \$12,557,529, an increase over the previ-

ous year of \$1,717,158.

The Yellowstone Valley.

THE NORTHERN PACIFIC RAILROAD SURVEYS—A
DELIGHTFUL REGION—GEYSERS AND BOILING
SPRINGS.

[From the Evening Post.]

It was at my own request that I was connected with Major Muhlenburg's party. The marvelous tales told of the Yellowstone excited my curiosity to see its wonders for myself, and I concluded that a trip through the valley would compensate for all the risks incurred from Sioux and other hostile tribes of Indians. Nor have I been disappointed. Here, within the space of fifty miles or so, there are certainly some of the greatest wonders on the entire continent. We saw tremendous waterfalls and canons, hot springs, geysers throwing columns of hot water forty-seven inches in diameter one hundred and ninety feet into the air, and jets from the column two hundred feet higher, mud volcanoes, &c. We found immense deposits of iron ore, gold quartz, copper and coal; precious stones, such as cornelian, chalcedony and rubies; many buffaloes, antelopes, deer and other animals.

Having left Helena in the latter part of July, going south and passing through the small villages of Prickly Pear, Springville and the like, we crossed the Jefferson and Madison and entered the Gallatin Valley, proceeding thence to the head waters of the Missouri. At this point, where the Jefferson and Madison and Gallatin unite to form the Missouri, we commenced our survey, with the initial point on the west side of the Jefferson. It is known as the "Three Forks," and presents a most grand and impressive view. Seated upon a rock which commands the course of the three streams, I contemplated for some time the landscape which unfolded itself before me. In the distance were the mountains, rising like a gigantic amphitheatre till their summits were lost in the blue sky. Nearer were the three rivers meandering through the valleys. The Gallatin flowed on my left, a river two hundred feet wide, as clear as crystal, rolling its voluminous waters towards the Missouri, which at this point runs in an almost due northerly direction. There are about a dozen ranches or farms scattered over the Gallatin Valley, all of which are in a prosperous condition. A postoffice has been established, and the people have determined to call this "permanent possibility" of a village Gallatin City. The country around is very beautiful, rich in minerals and adapted to all kinds of agricultural purposes. Mountains and valleys are alike covered with abundant wild grass, upon which the cattle grow fat in a very short time. The inhabitants who have lived long in that neighborhood assured me that even in winter the grass preserves its natural sweetness, and cattle which were carried there in bad condition were, at the end of the rough season, taken to market and sold for beef. The cattle are never housed in winter.

In the early part of September our party entered the Yellowstone Valley, having run their line through Bozeman, Fort Ellis, Rocky Canon, Roberts Pass—called after our distinguished chief, Mr. W. Milnor Roberts, of Pennsylvania—and down Trail Creek to the first canon of the Yellowstone river.

The great difficulty in the survey of this division was to find the most practicable pass through the Rocky Mountains for a railroad line. From a very careful personal examination of the Flat Head, Bridger, Trail Creek

and Bozeman passes, Major Muhlenburg, in opposition to previous engineers, selected the latter, and in my opinion his decision has been correct, for an excellent line, both as to gradients and curvatures, can be located through it, and the route from Fort Ellis to Shield's river can be adopted with a certainty of light grades as compared with the Pennsylvania Central and Baltimore and Ohio railroads. Nothing so difficult but search and pluck will overcome it. The problem is now solved so far as the Yellowstone division of the Northern Pacific Railroad is concerned, and the apprehensions of the oldest croakers set at rest. They predicted insurmountable grades and endless tunneling, but "all doubtful things are uncertain," as they will probably notice. This route, so far as we have surveyed it, has been examined by Mr. S. Low, one of our most distinguished engineers, and he concurs fully in the selection.

I come now to the Yellowstone Valley, the long wished for goal, so replete with natural wonders not dreamed of hitherto in our philosophy. When we struck the river it was in the afternoon of a beautiful day. To this point we had followed Trail Creek, a little affluent of the Yellowstone, whose water is as pure and refreshing as the spring which gurgles from the rock. It preserves its coolness throughout, though it runs for many miles through a country entirely open and treeless. Our course, till this creek empties into the Yellowstone had been nearly due south; here it changed and we began the descent of the latter, which at first flows towards the north, describes then a sharp curve and takes a north-easterly direction toward Fort Buford, below which it mingles with the Missouri. The Yellowstone is about three hundred feet wide and rolls over a rocky bed. Its current at first sight appears to be of extraordinary swiftness, for it is very noisy, owing to the numerous heavy boulders that lie in the bottom of the stream. It falls at the rate of eighteen feet to the mile. No water could be purer, cooler and clearer. The many islands it embraces in its course when viewed from the surrounding heights are very charming and picturesque. They are generally covered with cottonwood trees of considerable size, as are also both banks of the river. The country generally is comparatively naked, though cedar trees cluster here and there in groups on the mountain tops, in gulches or in canons, which may be counted by thousands all the way along.

There is little doubt that the Yellowstone Valley contains some of the best grazing lands in the world. Whether in bottoms along the riverside, or on the hills, the grass grows in abundance; and the herds that feed on it summer and winter require no other food, but keep fat and healthy. The weather, I find, is almost the same as in the East, with rather cold nights and an occasional fall of snow on the mountains.

— The consolidation of railway interests, which has latterly been in vogue in this country, has come into practice in the United Kingdom, where within a short time the London & North-western and the Lancashire & Yorkshire—two companies which hold about one-seventh of the railway capital of Great Britain—have been consolidated with nearly \$500,000,000 capital.

— A new coastwise and river steam navigation company, to operate in connection with the Northern Pacific Railroad, is forming in Oregon, with a capital of \$1,500,000.

THE GREAT RAILROAD CASE.

Decision of Chancellor Zabriskie.

THE INJUNCTION DENIED—THE DIRECTORS HAVE POWER TO LEASE.

[Continued from page 316.]

THE LEASING POWER.

But because the corporators may with the consent of the State, by the vote of a majority or two-thirds in interest, abandon their enterprise, sell out their property, and return his share of the proceeds to each stockholder, it does not follow that by the same authority the works may be leased to be carried on and conducted by others, the corporation continuing to exist. The right to elect the directors by which the business is to be managed is a provision in the charter which the State or a majority can not interfere with; it is a contract. The true question on that point here is whether the making of this lease and contract is an exercise of the power of managing the business and concerns of the corporation conferred in the charter, such as can be used by consent of the legal majority of corporators without that of all.

Such directors have power to make contracts binding beyond their term of office, power to commute fares, and to do so for a fixed period: it is a power constantly exercised. They contract with express companies and other railroads for the use of their roads for a term of years for a stipulated price; such contracts are universally admitted to be valid if permitted by the State. These roads are public highways, on which any citizen or corporation of Pennsylvania has a right to travel and run trains. The State can not prohibit this as long as they are public highways, much less can the defendants. There is no reason why the directors should not make a contract with any one for a term of years that he might have the use of these roads for a stipulated price, nor why part of that price should not be the keeping the works in repair, and paying all dues and taxes. I see no reason why directors, the officers who are authorized by the charter to conduct the whole business and manage the affairs of the corporation, should not exercise that power by leasing the works to others obligated properly to perform all the duties of the corporation in a manner stipulated in the contract, and for such rent or consideration as in their judgment will be beneficial to the corporators as operating and maintaining the road themselves, or more so. This authority as to the stockholders must be founded on the provisions of the charter, and not upon a special authority from the State, which is required only to bind the State. No court of law in this State, or in any other State, so far as I know, has determined that the directors have not such power, if exercised with the consent of a majority of the stockholders. It has never been held that there is an implied contract in the charters that the directors of such corporation shall not exercise their power in this manner. On the other hand, it has been held that a Legislature, clothed with the power of making and changing the laws, clearly including the power and duty to levy taxes, and provide highways, may by stipulations in charter and other laws deprive themselves and their successors of the power of levying taxes on any portion of property in the State, and of making roads in any part, and of course in the whole of its territory, and this must now

be regarded as law until wise counsels still cherished prevail; 11 Wallace, 441, Washington University vs Rouse. And this under constitutions which provide that the law making power shall be vested in representatives elected yearly by the people. If this can be done, much more may the directors of a corporation so exercise their powers, especially by the actual consent of a majority of the corporators, which in that case is equivalent to a change of Constitution in a State by a majority of the whole people. Whatever view may be taken at law such power seems equitable as the owners of two-thirds of the stock have power by contract for proxies or other means to pledge their stock to vote for directors who would from year to year renew and continue such contracts.

DIRECTORS' POWERS.

Over much, if not the most of the property to be transferred by this lease, the directors have absolute control. They can dispose of it without the consent of the State or the stockholders. Of this class are the lands and real estate held not needed for sustaining their proper works. All moneys and securities for moneys invested. All shares of stock in other corporations and all leases of other works or roads. It has been questioned whether the defendants had power to take or hold such stocks or leases, even with consent of the State, and whether all these acquisitions were not *ultra vires*. But the charter of each of these corporations gives absolute power of "purchasing holding and conveying real and personal estate," without limitation, and to make it stronger, if that is possible, in the New Jersey charter the words are "*any real or personal estate*." In each case the last clause of the section grants all rights and powers pertaining to corporate bodies, necessary for the purposes of the act. This limitation can not be annexed to the right of holding property, because the two clauses are separated by other provisions of a different character, and the annexing the qualification to one power and not to the other seems to indicate the intention to grant the one as it reads without the limitation, "*Expressio unius est exclusio alterius*." I know that it has been held in many cases that the power conferred on corporations to hold property is confined to such property as is necessary or convenient for the purpose of the charter, yet these decisions, I apprehend, will be found to be made upon charters containing that limitation. Although the dictum of Potts, J., in the State vs Mansfield, 3 Zab. 510, would seem to apply that construction to these charters. But even if that limitation must be applied by construction to the express words of those charters, yet the application of the principle by the decision in the State vs Mansfield is that the authority to hold extends to all property that it may be expedient or convenient to hold the better to effect the purposes of the charter, such as dwelling houses for employees, though these were not adjudged to be free from taxation, like houses for lock tenders, car and repair shops, which were necessary or proper for maintaining and operating roads and canal. This construction would include the stock in the Belvidere and other tributary roads, and even the stock of the Jersey associates necessary to obtain the ferry privilege so important to the profitable operation of the New Jersey road. Unlimited powers of holding any real or personal estate would in all cases authorize the directors to purchase and hold such property when bought in good faith to promote and further the objects of the corporation, even without the consent of the

stockholders. But all such property not expressly authorized to be held by the charter, or necessary for its proper objects, the directors may dispose of by sale or lease, or in any manner at their discretion without the consent of either the stockholders or the State. They may also thus dispose of any cars, locomotives, steamboats, or fuel provided expressly for their works. They may sell or dispose of their wharves and ferry landings in New York or Philadelphia and purchase others, or may discontinue any ferry. They may, and constantly do, lease parts of these, and of their other real estate not needed for present use. They may take up and discontinue any side tracks or stations that are useless; the New Jersey company took up the third rail laid on each track to enable the cars of the Erie Railroad to reach the Jersey City ferry. It sold its branch railroad and bridge at Newark, and the right to occupy part of its road bed, to the Hoboken company. These sales and changes were made without consent of the Legislature or the stockholders, and were within the corporate powers. The directors could abandon, and take up, the second track on the whole route, and sell the rails if it became useless, and a source of loss by decrease of business. They can discontinue any train or trains, and any station, except such as they are bound by their charter or by contract to continue.

It may be a serious question whether either of the defendants is bound by its original charter either to the State or its stockholders to operate its road. The Canal company is neither bound or authorized by its charter, expressly or by possible implication, to run boats on its canal; the Camden & Amboy company is neither bound nor expressly authorized by its charter to run trains on its road; and, by the rules of strict construction, insisted upon by the counsel of complainants, authority to run trains can not be sustained by implication. The implication is very slight. It can not be had from the power to construct and maintain the railroad, any more than the franchise of being a transportation company could be implied to be granted to any turnpike or plank road company. The word transportation in the name does not imply it, because on the water they were made a transportation company by express enactment; on land a railroad and on water a transportation company. The name was apt. The 11th section, which states the object and confers the power, confers power only to construct the road, not to operate it. The sixteenth section, which provides for tolls and charges for transportation, will be satisfied by tolls on land and transportation on water. And the part that speaks of its use of the road does not necessarily imply the use by running trains, but is satisfied by its being kept in repair and used for earning tolls. The eighteenth section, providing against injury to its works, carriages and machines, raises the very slight implication which may be drawn from the fact that it was contemplated that it might for some purpose own carriages and machines; certainly no authority is here given to run trains either expressly or by necessary implication which is insisted on by the complainants as necessary to confer it. And the presumption against the implication seems strengthened by the fact that in three railroad charters granted in 1831, viz: "The Pat. & Hud. River Road" (P. L. 24), "The Paterson Junction Road" (P. L. 60), and "The Eliz. & Som. Road" (P. L. 80), and in three charters granted in 1832, viz: for "The New Jersey Road" (P. L. 96), "The Paterson & Hackensack Road" (P. L. 121), and "The N.

J., Hud. & Del. Road," 133, express authority was given to operate the roads with locomotives and cars, to charge one rate for tolls and another for transportation in the cars of the company. In 1815 a charter was granted to "The New Jersey Railroad Company" to construct a railroad from the Delaware to the Raritan, with a capital of \$500,000. This, with the steam navigation on the Delaware and Raritan, and had it been constructed by the parties interested, would have furnished a direct and expeditious route of communication from Philadelphia to New York, and of transit over this State from all parts of the Union. It was, so far as I have been able to ascertain, the first railroad charter granted in America, and it shows that New Jersey has always been foremost in works of public improvement, and willing not only to permit, but to provide for the passage of all across her territory. This act provided in its tenth section for rates and charges for transportation of merchandise and products and tolls for all persons using or traveling on the road. But no other or express power for running trains was given. The implication is a little stronger in this than the other. Yet either act may be read and fairly construed as merely authorizing the construction of a road to be used only by the public with their own carriages, horses and motive power, like a turnpike or plank road.

Yet no one can doubt but that in both these cases both the Legislature and the corporators supposed that the right to operate these roads was granted by these charters. The first charter was granted at the session of the Legislature next after Geo. Stephenson in 1814 placed his first locomotive on the Killbuck Railroad, and succeeded by surface traction in drawing a load of 14 tons six miles per hour. The other was granted at the session next after his famous engine, the Rocket, the father and prototype of our present improved locomotives, was put in successful operation at the opening of the Liverpool & Manchester Railroad in 1829. It had attained its fastest speed of 29 miles unloaded, and with a load of 50 tons 14 miles an hour. These roads were both projected, at least in part, for locomotives, and probably the projectors intended that these engines should be run by the corporations.

But although thus the conclusion may be arrived at with some difficulty that this corporation was authorized by the charter to equip and operate its road, there is clearly, neither by express enactment or implication, any obligation to the State, or contract with its stockholders to do this; and that contract, and not the power to do it, is the question now under consideration.

In the charter of the New Jersey Railroad Company there is clear and express power to equip and implied power to operate the road granted in the 16th section. But neither this section nor any other part of the charter makes it obligatory. It is compelled to construct and maintain the road under pain of forfeiture of the charter. This act declares the road a public highway, and provides for the use by the public, limits the amount of tolls to be charged, and directs toll boards to be put up at the toll gate. The duty of the company to the public would be fulfilled by constructing and maintaining the road. This power, like the power to construct branches, to erect dums and dykes, and every other mere power granted by the words, "it may be lawful," or "it shall have power," may be exercised or not at the discretion of the directors. If such corporations provided omnibuses, waiting rooms and lunch rooms, for the accommo-

dation of travelers, or baggage wagons, trucks and store rooms for baggage and freight, which they have power by implication to do, they can change or abolish them at pleasure if they become unnecessary, or the directors are of opinion that these conveniences will be better furnished by others. The directors of these companies have power to discontinue any train, or half the number of trains run, and to reduce the fares and rates of freight, although in the opinion of the stockholders, and, in fact, these changes may be injurious to the interest of the company. The stockholders have no right to require the directors to exercise to its fullest extent, or at all, any discretionary power conferred by the charter.

If these principles are correct the defendants by their directors have the power to discontinue operating the roads, and to sell and dispose of all their equipment or plant. And the only question that remains is whether they can by lease delegate the power and duty to keep the road in repair, with the right to operate it, to another corporation for a consideration which in their opinion is adequate and beneficial to the stockholders. I am of opinion for the reasons above stated, that they have such power.

As before observed, there is no decision against such power to lease; and there are many instances in this State in which such leases have been made and approved by the Legislature. They have been made by corporations, the management of whose affairs was by charter intrusted to directors elected from year to year as in this case. The Paterson & Ramapo roads were thus both leased to the New York & Erie company; the Warren Railroad, and the Morris & Essex Railroad were both thus leased to the Delaware, Lackawanna & Western Railroad Company, the Morris Canal to the Lehigh Valley Railroad; the Pemberton & Hightstown Railroad, and the Camden & Burlington Railroad, were severally leased to the joint companies. None of these cases received the assent of all the stockholders, and they were all authorized or sanctioned by the Legislature without such assent. These leases were unquestionably made with the advice of the most eminent counsel in the State, and their validity has never been questioned by any one in the courts, but they are both matters of great weight, and to be regarded in considering the question, especially in a court of equity on a motion for preliminary injunction where the question is, as this, merely a question of law, and has never been settled by the law courts, and the right to relief depends upon it.

HOW THE DISSENTING STOCK IS AFFECTED.

But if I am right in the conclusion arrived at above, that the majority of corporators, under a charter which specifies no definite time for its continuance, have a right to abandon the undertaking and dispose of and divide the property, the proceeding in this case is valid as against the complainants as a lawful way of accomplishing that end as to them. Two-thirds of these corporators have determined that they do not desire to go on with these enterprises under the charters, and that they wish to abandon them and are willing to accept as their share of the corporate property a yearly rent or annuity secured by provisions like that contained in this proposed lease. Some stockholders are not willing; and although the majority can effect the abandonment, they can not compel the dissentients to accept like compensation for their stock, it might be compelling them to embark their capital in a new enterprise. Provision is

therefore made to pay or return to them the full value of their share of the whole property of the corporation. This is all they would have if the works were sold out. The provision is a most equitable one, and without it the transaction, even if valid and legal, would not be equitable and just.

In arriving at this conclusion, I do not change or modify any of the positions laid down in the case of *Zabriskie vs Hackensack & New York Railroad*, except so far as the correction of an inadvertent expression, heretofore noticed, is concerned, on the contrary, I reaffirm them all as founded upon established principles that can not be changed consistently with good faith and justice. Capital contributed for one purpose, under a charter declaring that purpose, can never be applied to one substantially different without consent. I hold that a charter which declared that the undertaking should be prosecuted for a definite time is a contract for that time, and binds all to continue it. But that, on the other hand, a charter that states no such definite time, like a partnership made in that manner, can be abandoned by a majority; that there is no contract which prevents it; that the will of the majority, which is the law of corporations, must govern. And if there were no such law, that, like all other law, may at any time be enacted or changed by the Legislature, who may declare that a majority or two-thirds of the stock or of the corporators shall govern. Of course, such law would not affect corporations with irrepealable charters declaring a different rule.

TAKING PROPERTY FOR PUBLIC USE.

Again, the defendants contend that the lease and the act authorizing it must be sustained, on the ground that this property is taken for public use, and that compensation is provided. The complainants deny that this is taken for public use, and argue that the act provides for compensation only after the taking, and is therefore void by the constitution of the State.

The property of a corporation, such as bridges, turnpike and race roads, with its franchises, are property, and as such are subject to the power of eminent domain, and may be taken, upon compensation, for public use. Any other corporation could be thus authorized to take the whole or any part of the roads of the defendants. Highways, whether by railroad, canal, turnpike roads, or common roads, are for the public use. It is one of the functions and duties of government to provide them. This is a duty recognized in all civilized nations from time immemorial. The absolute duty is only to the subjects or citizens of the nation or State. But among modern nations, by comity, neighboring countries are always permitted to use their highways, and railroads and other highways are often constructed to accommodate the inhabitants of such countries in passing to and through them. These roads are built by the sovereign power and for a public use, and in these United States, bound together in one country with many common interests, and in which the citizens of many States can only reach other States, or the seaboard, the harbors, and marts of commerce, by crossing intervening States, the construction of highways for such purpose, although only required by comity, is for a public use. The law unquestionably as is laid down by Chief Justice Beasley with so much clearness in the case of the *Del. & R. Canal Co. vs the Rar. & Del. R. R. Co.*, 3 C. E. Green, 501, that one State can not as a right demand that a certain mode of passage shall be provided for her citizens and

her property by any other State. Yet as the Federal Government has not been empowered and has not yet assumed the power to construct railroads through States, it seems almost a moral duty or imperfect obligation upon each State, especially one situated as this State is, to provide for passage across it by citizens of sister States. If the State chooses to do this it may, but it is an act done in its sovereign capacity, and the property taken for it is taken for public use. The Camden & Amboy Railroad was constructed across the State for that purpose and that only. Its termini were the cities of New York and Philadelphia. The second section of the charter declares its purpose, which was to "perfect a complete line of communication from New York to Philadelphia." It is obliged to provide steamboats at either extremity of the road, to transport passengers and goods from city to city, but not for local passengers or freight. It was not obliged to have depots or stops for passengers or freight at any point in the State, and while the railroad was declared a public road for all who could get their carriages upon it, there was no obligation to provide switches or turnouts anywhere along the line for the accommodation of Jersey men. Pennsylvania, by an act of February 16, 1841, provided that the New York & Erie Railroad might pass for about 15 miles through the north east corner of the State, and might take land by the power of eminent domain. New York authorized the Morris Canal Company, a corporation whose works were wholly in this State, to condemn lands in that State for a reservoir for a feeder for the canal, and it was sanctioned as a proper exercise of eminent domain—*Morris Canal Company vs Townsend*, 24 Barb. 658. This State, by the act of February 21, 1856, P. L. 42, authorized the New York & Erie Railroad Company, a foreign corporation, whose business was to convey passengers and freight from Dunkirk and other points of New York to New York city, to proceed in their own name to construct a railroad from the Paterson Railroad to a point opposite New York city. The act gave power to condemn lands, which was acted on as appears by the case of *Ross vs Adams*, 4 Dutch. 180, and *1 Vroom*, 505, where the dispute was concerning funds in court the proceeds of lands so condemned. The State of New York authorized the New York & New Haven Railroad Company to extend its road through that State and take lands by condemnation. But in the present case the public use does not depend on this alone. The object of consolidating the business of these companies is to facilitate and improve communication all along their lines. The large business and manufacturing cities of New Jersey are upon the route of the United Companies. Many of these cities constantly receive and send goods and passengers from and to places in the interior of Pennsylvania, Ohio, Illinois, and other Western States; if the communication is really improved, which is the object and intent of giving this power, it is a public benefit to the citizens of this State in providing a more convenient highway for their intercourse with the Western part of our own country. Taking the roads of these companies for this purpose is clearly taking them for public use, and for the use of the citizens of this State; it is simply furnishing the proportion of this State for the highway that will be provided by this union of companies, or one consolidated company from the Pacific to the Atlantic, for the common use of all the citizens of the nation, including those of New Jersey.

THE DEFENDANTS WHOLLY POWERLESS

If the defendants and all their stockholders had refused consent, the State could still have authorized the taking of these roads for the purpose contemplated by the condemnation. But the act of 1870 did not provide for this. Its intention was only to allow these roads to be taken if two-thirds of the stockholders should consent. In that case the act intended that the stock or interest of the others who did not consent, should be taken by condemnation. It is only when no bargain can be made with the owner that the power to condemn is usually given. And if the owner of an undivided share, or an estate for years, for life, or in reversion in lands required, consents, his estate need not be condemned, but only the estate of those who do not agree to sell. It is fair and equitable, that such stockholders as prefer to take the arrangement made by their directors for them, a perpetual annuity of 10 per cent on the par value of their stock, to receiving its actual value as represented by the property, should be permitted to accept such compensation, they could not be compelled to take it. And that the others should receive what the law requires in all cases of condemnation, the money value of their property as compensation. The objection that in this case the defendants and not the Legislature determine that the case is a proper one for the exercise of the power of eminent domain is not founded in fact. There are only a few companies in the State and a few out of the State, whose works connect with those of the defendants. The Legislature have determined that consolidating business with either or all of these is for public use, and a proper occasion for the exercise of this power.

But the statute only provides for compensation after the road is taken. The Constitution, art iv, secs 7 and 9, provides that "private corporations shall not be authorized to take private property for public use without just compensation first made." A like provision was inserted in the act consolidating the United Companies and in several other statutes of this State enacted since the present Constitution, authorizing like changes. Thus sanctioned by legislative approval, and that of the counsel under whose advice these important transfers have been made, it would seem presumption to treat it as invalid and of no effect, even if that was my opinion.

But it seems to me that the taking intended to be prohibited by the Constitution is an illegal or forcible taking possession without the consent of the owner. It does not prohibit receiving or accepting by consent of the owner, when the compensation is to be settled afterward. Any one in lawful possession, or having the legal authority to do it, may give possession before compensation. If a tenant for life or years gives possession of the land and consents to its use, a railroad company may enter under him, and this would not be taking the property of the reversioner. His estate may be taken and condemned when the reversion falls in. Compensation to him must be made, then, before his estate is taken. The directors of these defendants are in the possession and control of these roads. The roads are not in the possession of the complainants. The corporation, not the complainants, have the title; the stockholders have neither the legal or equitable title, or the right to the possession. At the lease the directors will give up the possession of the property. It will not be taken from them. But on the hypothesis that they have not the right to do this as against the complainants, the com-

plainants will have the right to call them to an account in equity as their *cestui que trusts*, and to compel the lessor to surrender the lease as obtained by a breach of trust in which they were abettors, and compel the directors to account for the profits which would have accrued but for the breach of trust. Their property in the stock is not taken, impaired, or affected by the lease. They can alter it, proceed for any redress to which they were entitled before it. But upon the proceedings prescribed by the act for condemnation being had, and after compensation paid, the stock which was their property is taken, and their right to any other redress is gone; thus the compensation is first paid before this property is taken.

THE QUESTIONS OF CONSTITUTIONAL LAW.

Here are unsettled questions of constitutional law, proper for the courts of law to determine. Upon them rest the right to this injunction. Were my leaning the other way, it would be against the settled rule of equity to grant an injunction upon a doubtful right, where the injury by arresting and possibly defeating a negotiation like this might be so great and irreparable. Especially in a case where only a little more than one-sixtieth of the stockholders apply, and the rest by their silence acquiesce in, or by their written consents approve of, the proposed contract, and where the act provides for compensation to be made by their own trustees, upon a simple notice that they demand it. The objects of courts of equity in interfering where property is taken contrary to the constitutional provision, is to save citizens whose property is taken from the expense and trouble of pursuing at law strangers, who, without legal right, take their lands. Here it is a claim against their partners or trustees. Equity does not relieve by injunction in all cases of violation of constitutional provisions. The Supreme Court of Pennsylvania, in *Mott agt. Pennsylvania Railroad Company*, 6 Casey, 23, refused unanimously a preliminary injunction on this ground to a stockholder who was offered compensation by the act, and held that his rights were to be determined on the final hearing.

Another question is as to the power of the corporation lessee to enter into the proposed contract; whether they can bind themselves to it, or whether it is not *ultra vires*, and, therefore, all their undertakings void. The position of the defendants' counsel, that this is only a question between them and the State that created them, to be raised by its officers, and in which the complainants have no concern, is not sound. If these directors deliver over to the lessee all this property, and these valuable assets, some of which to the amount of millions, it may take away and convert to its own use, without being liable on their obligations; this would be such faithless and improvident waste and squandering of the assets of these corporations and corporators as would entitle them to the preventive protection of a court of equity.

That a foreign corporation may own property in this State, and transact business, and make contracts in it to be performed here, is too well settled to discuss. There is no law of this State prohibiting it. The capacity of such foreign corporations to hold property and transact business depends upon the law of the State which created it. If that gives it power to own, lease, or use, property in another State, it has that capacity. The Pennsylvania acts of Feb. 17, 1870, and May 3, 1871, set forth by the answer, unquestionably gives this authority. This allows of no discussion, and

was frankly admitted by the distinguished counsel who closed the argument for the complainants; he only excepted from it the personal property and stocks in other companies whose railroads do not connect. But that restriction is only as to the roads embraced in the lease; it gives authority to enter into *any other contract* with companies owning connecting roads. This surely will include power to take, with such railroads leased, all property which the lessees hold for the furtherance of the objects of the leased road, as appurtenances to it—charters and statutes of a foreign State must be construed here as by the courts of that State. Am. Print Works agt. Lawrence, 3 Zab. 590. And it was held in the Supreme Court of Pennsylvania in the Philadelphia & Erie Railroad Company agt. the Catawissa Railroad Company, 53 Penna. R. 20, that a statute authorizing the lease of one railroad by another company authorizes it to lease another railroad leased to the lessor as *appurtenant* to its road. And many decisions of that Court besides that in Gratz's case, held leases and purchases made by these lessees without the consent of all the stockholders, to be valid.

[Concluded in next number.]

SALE OF THE GREENVILLE RAILROAD—It is announced that the South Carolina Railroad has purchased a sufficient amount of stock to obtain control of the Greenville & Columbia Railroad. The interest of the "Ring," we suppose, which amounted to fifty thousand shares, constitutes the purchase. We have frequently heard rumors to this effect during the present year, and doubtless negotiations to this end have been pending for many months, but the information about the actual sale comes to us in such a shape that we think it may be relied upon that the Greenville & Columbia Railroad has again changed hands. It is a matter of congratulation, in our opinion, that the South Carolina Railroad obtains this control, and that the people of the up-country will enjoy a continuous, uninterrupted line of communication with our principal seaport. We wish the new combination every imaginable success.—*Andersonville Intel.*

—The Chicago, Danville and Vincennes Railroad Company, have completed their road from Chicago to Danville, and the Evansville and Terre Haute Company have also completed their line north to Danville, thus forming a new and almost air line route from Chicago to the Ohio river, and thence by the Henderson line to Nashville and all points south.

The striking feature of this important work is that it places the Indiana block-coal fields in direct connection with Chicago and the North-west.

"The Chicago, Danville and Vincennes Company are prepared to open their line with a large equipment, and in connection with the Evansville and Terre Haute Company will at once place six hundred cars in the coal traffic alone. The iron mills and other manufactures already established at Chicago require of this coal fully five hundred thousand tons per annum, which will be cheapened by the opening of this road more than one dollar per ton.

"The road runs for its entire length through one of the most fertile sections of the State of Illinois. It has been built with unusual thoroughness in all respects, and from its location as the shortest through route from the lakes to the South, and especially in its advantages for the coal traffic, it must at an early day take rank with the best lines terminating at Chicago."

Testing Steel by the Microscope.

John Schott, an eminent chemist, asserts that different qualities of iron and steel can readily be distinguished by means of the microscope. The crystals of iron are double pyramids, in which the proportion of the axes to the bases varies with the quality. The smallness of the crystals and the height of the pyramids composing each element are in proportion to the quality and density of the metal, and these are to be detected also in the fineness of the surface. As carbon diminishes in steel, the pyramids have less height. In pig iron and the lower qualities of hard steel, the crystals approach more closely the cubic form.

Forged iron has its pyramids flattened and reduced to superposed parallel leaves, whose structure constitutes what is called the nerve of the steel. The best quality of steel has all its crystals disposed in parallel lines, each crystal filling the interstices between the angles of those adjoining. These crystals have their axes in the direction of the percussion they undergo in the working. Practically good steel, examined under the microscope, has the appearance of large groups of beautiful crystals, similar to points of needles, all parallel.

The following is a comparative statement of the consumption of cotton in all Europe during each of the twelve years ending September 30, 1871:

Years.	Gt. Britain. Bales	Continent. Bales.	Total consumption. Bales.
1870-71	3,222,000	2,016,000	5,268,000
1869-70	2,760,000	1,627,000	4,387,000
1868-69	2,587,000	1,916,000	4,503,000
1867-68	2,822,000	1,782,000	4,604,000
1866-67	2,414,000	1,733,000	4,147,000
1865-66	2,319,000	1,616,000	3,935,000
1864-65	1,873,000	1,182,000	3,055,000
1863-64	1,565,000	1,033,000	2,598,000
1862-63	1,332,000	814,000	2,146,000
1861-62	1,217,000	776,000	1,993,000
1860-61	2,612,000	1,776,000	4,388,000
1859-60	2,560,000	1,712,000	4,272,000

—At a meeting of the stockholders of the Cleveland & Pittsburgh Railroad Company, in Cleveland, on the 21st inst., the lease of that road to the Pennsylvania Central company was ratified by a large majority.

—The *Missouri Republican* of the 12 inst. says: "The directors of the Cairo & Fulton Railroad of Arkansas, met in this city yesterday and completed their organization. The general office of the company is to be in this city. The following are the officers: Thomas Allen, St. Louis, President; H. G. Marquand, New York, Vice-President; D. W. McWilliams, Treasurer; Wm R. Donaldson, Secretary; James M. Loughborough, land commissioner; James H. Morley, Chief Engineer. The two latter officers will have their quarters at Little Rock.

"The directors are Messrs. Thos. Allen, H. G. Marquand, W. R. Allen, Elon G. Smith, Sylvester A. Luffin, L. B. Clark, John H. Swift, Wm. H. Swift, Alanson Trask, W. T. Blodgett and Henry M. Alexander.

"The offices of the St. Louis and Iron Mountain Railroad Company and the Cairo and Fulton Railroad Company will be in the new building north-west corner of Fifth and Market Streets."

TO CENTRAL AFRICA BY RAIL.—The *Milla Times* says:—"While people are talking of a railway to India direct, to accomplish the passage from London to Calcutta in five days, the Viceroy of Egypt has actually commenced one of the most gigantic undertakings ever attempted in his territory—that of connecting Upper and Lower Egypt by rail. At the terminal point of all ancient and modern conquest, where the mighty Persian and Roman invaders found the desert an impassable barrier, the Khedive, assisted by an army of English engineers and navvies, will, unless stopped by the jealousy of the Sultan, drive an iron road and a team of iron horses not only to the confines of Nubia, hut into the heart of Africa, opening up new fields for commerce, and perhaps bringing home Livingstone first class. When it is considered that the line, commencing at the Second Cataract, is to be 600 miles long, some idea may be formed of the amount of labor required to complete the work."

SCARCITY OF OAK IN EUROPE.—Oak timber is disappearing from Europe with great rapidity. France, with an annual production of 1,320,000,000 gallons of wine, is especially injured by this change. In 1857 she imported 20,000,000 of staves; in 1866, she imported 63,000,000, at a cost of \$9,000,000. Most of this timber came from Austria. France requires every year 1,500,000 cubic feet of oak timber for wine casks, 600,000 for her fleet, 150,000 for railway cars, and 750,000 for building purposes. In 1826, oak staves were worth six cents each of our money; in 1866, they were worth fourteen cents each. In 1826, the total value of imported staves was \$4,000,000; to-day, the total value is \$30,000,000. A similar increase in the importation of oak for the next thirty years would probably double the present price.

BABCOCK EXTINGUISHER.

Cheapest and Best Protection
AGAINST FIRE.



Puts Out Burning Kerosene,
BENZINE, TAR, ETC.

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Where it is Introduced.

The attention of Practical Railroad Men is earnestly invited to the record of work done, and to the fact that nine-tenths of the fires that kindle at stations, in wood piles, and on Trains, are within the power of this Machine when discovered.

F. W. FARWELL, Secretary,
122 Washington Street,

CHICAGO.

H. J. BOND, Gen'l Agent,
22 West Fourth Street,
CINCINNATI.

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WRIGHTSON & CO.,

RAILROAD RECORD OFFICE,

No. 167 Walnut Street, Cincinnati, Ohio.

The Railroad Record.

E. D. MANSFIELD, - - - - - } Editors
T. WRIGHTSON, - - - - -
A. J. HODDER, - - - - - }

CINCINNATI THURSDAY, NOVEMBER 30, 1871.

The Railroad Record,

PUBLISHED EVERY THURSDAY MORNING,

By Wrightson & Co.,

OFFICE—No. 167 Walnut Street

SUBSCRIPTIONS—\$3 per annum in advance.

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WRIGHTSON & CO., Prop'rs

Foreign Commerce of the United States.

IMPORTS AND TARIFF DUTIES.

This journal having since its establishment been a journal of statistics, commerce and finance, as well as of railroads, we propose as we may have time and space, to give in a plain, familiar way, some of the representative facts in the condition of our commerce, foreign and domestic.

It is known to all intelligent persons that commerce in our country has increased at an eminently rapid rate, and that foreign commerce is now increasing very rapidly; and the increase of all commerce is much greater than that of the population. This is caused by the fact that commerce increases with the increase of the surpluses of production. The whole amount of production may not increase faster than the people, but the surplus does, because in addition to the labor of so many people there is constantly added the aids of new machinery and the economy of consumption. This is the basis of wealth and the basis of commerce.

This increase of commerce has caused some modern political economists to think commerce is the basis of political economy, and in order to increase commerce, as they think, they advocate what they call free trade. We are not now about to consider this subject, but if possible state clearly the great facts of our present commerce, and the relations of that commerce to the tariff.

1. The first fact we wish to discover is exactly how much the increase of our foreign

commerce has been; and next we will see what the tariff has been at these periods; and lastly, when we have done found this, we find what the relations of these elements are. We will take five decennial periods, from 1830 to 1870 inclusive. The following table gives the whole amount of importations in each of those periods, the amount of revenue collected from the tariff, and the average rate of duty:

	Importation.	Revenue.	Rate.
1831	\$70,876,920	\$21,922,391	31 ¢ ct.
1840	107,141,591	13,499,502	13 “
1850	178,138,318	39,668,886	32 “
1860	362,166,254	53,187,511	15 “
1870	462,377,587	200,000,000	46 “

These facts, if we refer to the history of the tariff in those periods, show that the commercial stability of the country were greatest when the tariff was highest; and, secondly, they show that a high tariff did not impede the progress of commerce, for, from 1860 to 1870, the imports increased one hundred millions, and a rate fully equal to the increase of population. But we can not fully understand this table unless we understand first the rates of the tariff at these respective periods. The following table shows the rates of tariff duties on the leading articles:

	1830.	1840.	1850.	1860.
Coffee	5c lb	free	free	free
Tea	25c “	10c lb	free	free
Sugar	3c “	2½c “	30 ¢ ct.	24 ¢ ct.
Silks	free	free	25 “	19 “
Wool	15 ¢ ct.	free	30 “	24 “
Wool goods.....	40 “	44 ¢ ct.	30 “	19 “
Cotton “	25 “	3½c yd	20 “	19 “
Pig iron.....	\$13 ¢ ct.	\$10 ¢ ct.	30 “	24 “
Bar “	37 “	30 “	30 “	24 “
Blankets.....	45 ¢ ct.	40 ¢ ct.	25 “	19 “
Flannels.....	45 “	40 “	25 “	19 “
Wines	30c	10c	40 “	30 “

This was the state of the tariff from 1830 to 1860 inclusive. In 1830, the tariff was that of 1828. In 1840, it was under the operation of the act of March 2d, 1833, called the Compromise Act. In 1850, it was under the horizontal tariff of 1846, which classified the articles in different horizontal duties. In 1860, it was under the tariff of 1857. We come now to the War tariff of 1863-4, and which prevailed in 1870. Before the act of 1870, and under the War tariff, the duties on the same articles were as follows:

Coffee.....	5c ¢ lb
Tea.....	25c “
Sugar.....	3c “
Silk	50 ¢ ct.
Wool	40 “
Woolen goods	80 “
Cotton goods.....	35 “
Pig iron.....	\$9 ¢ ton.
Bar iron.....	25 “
Blankets.....	75 ¢ ct.
Flannels.....	85 “
Wines.....	75 “

Now, the special things to be remarked here are: 1. The higher the tariff the greater the revenue, notwithstanding all that has been said about prohibitory duties. The country

received \$200,000,000 of revenue in 1870, while it received but \$53,000,000 in 1860, under the tariff of 1857. 2. The country was much more prosperous, in a commercial point of view, under the high tariffs, than under the low ones; for example, in 1830, under the tariff of 1828, and in 1870, under the tariff of 1863-4-5, the country was commercially much more stable and prosperous than under the intermediate tariffs. Yet, they were the highest tariffs of the series. 3. In 1840 the country had been gradually, from 1833, approximating what is called free trade, that is, a reduction or entire repeal of taxes by the tariff, so as to put no restrictions upon foreign commerce. The result was, first, an immense stimulation to imports, then a sudden demand for specie to pay for them, then a contraction and a suspension of the banks, and finally a rapid reduction of the revenue, till the country was nearly bankrupt. This is a brief history of an attempt to introduce the principles of free trade into the revenue system of this country. In 1840 these events had reached their crisis and climax. The result was a political overthrow of the party in power. This, however, was but temporary; after a brief period of a protective tariff, the horizontal tariff, as it was called, was enacted in 1846. This was by no means a free trade measure, but was not sufficiently protective, and in a few years, when its full effect was developed, the results were disastrous. In 1854 was a great commercial crisis, which arrested the railroad progress of the country, and in 1857 was a crash. Then the tariff was again modified; but the commerce of the country, as well as its manufactures, was never so prosperous as they have been under the high tariff of the War and since. With this fact before—let us alone.

The Babcock Extinguisher.

OFFICE MICH. CENTRAL R. R. }
CHICAGO, Nov. 12, 1870. }

F. W. FARWELL, Secretary:

Dear Sir—In reply to your inquiries as to the Babcock Fire Extinguishers since being placed upon our road and trains, our record shows the following instances, where they have been used:

July 5—Refreshment room in passenger depot at Jackson.

September 5—Baggage Car No. 1355, on Fast Chicago Express; Conductor Chase.

September 12—Baggage Car No. 133, on Fast New York Express; Conductor Harris.

September 28—Coach No. 9, on Fast New York Express; Conductor Chase.

In each of these cases, I am informed, the ready use of the machines undoubtedly saved considerable destruction of property and delay of trains.

Truly yours,

H. E. SARGENT, Gen'l Supt.

Eggleston Avenue.**ORDINANCE TO VACATE.**

The following is the text of the ordinance to vacate Eggleston avenue, as it passed the Board of Aldermen, on Friday, Nov. 24:

An Ordinance to Vacate Kilgour street and Eggleston avenue, between Front and Pearl streets.

WHEREAS, On the 22d day of September, A. D. 1871, the Newport & Cincinnati Bridge Company filed its petition with the Common Council of the City of Cincinnati, praying for the vacation of Eggleston avenue between Front and Pearl streets; and of Kilgour street between Front and Pearl streets; and

WHEREAS, Notice of the pending and prayer of said petition has been given by publishing the same in the Cincinnati Daily Times & Chronicle, a paper published in said city, for six consecutive weeks, hereto preceding, according to the statute in such cases made and provided; now, therefore,

SEC. 1 Be it ordained by the Common Council of the City of Cincinnati, That Kilgour street as laid out and dedicated by plat and subdivision of Eggleston, dated November 18, 1835, and recorded in book No. 68, page 52, Hamilton County Recorder's Office, from the north line of Front street to the south line of Pearl street, as described in an ordinance passed by the City Council, on the 19th day of February, A. D. 1864, entitled "An ordinance to open, widen and establish Eggleston avenue the full width of ninety (90) feet, from the Ohio river to Broadway," be and the same are hereby vacated, in order that the same may be hereafter used and occupied by the said Newport & Cincinnati Bridge Company and the Little Miami Railroad Company and its lessees, for railroad, bridge and depot purposes.

Provided, however, That the vacation and grant to the said bridge company and railroad companies is made expressly subject to all the rights of the State of Ohio, and of any and all persons lawfully claiming under or through it to or in said streets, or either of them, or to any easement in or over the same, and also subject to the legal rights of any other person or persons injured thereby.

Provided, further, That the said bridge company shall, at its own expense, cause Butler street to be widened to the width of ninety-nine (99) feet from Pearl street south to the wagon road approach of said bridge, and also that the said bridge company shall, at any and all times hereafter, permit its bridge and approaches to be used for railroad purposes on reasonable and equal terms as to tolls and charges by all railroad companies whose roads terminate in or pass through the city of Cincinnati, desirous so to do, and it is expressly understood, and the grant herein contained is upon the consideration that the Trustees of the Cincinnati Southern Railway, or any lessee thereof, shall have the right to use said bridge and the approaches thereto on terms as favorable as those granted to any other railroad.

And provided further, That in no case will the said companies or their lessees use or permit the said grounds to be used as a stock yard or depot for the shipment, transshipment or reception of animals of any kind, or for any other use than for depot buildings and railway purposes.

And provided, further, That said bridge company and railroad companies, or either of them, shall not in any manner hinder or pre-

vent the city from going upon the grounds so vacated, and completing, maintaining or preserving the sewers or waterways already constructed or projected, or for carrying out any of its plans for sewers, or discharging any of its obligations for waterways or powers that are now or may be hereafter fixed or determined, from any rights now in existence.

Provided, That this ordinance shall take effect on the Newport & Cincinnati Bridge Company and the Little Miami Railroad Company and its lessees filing with the City Clerk a written acceptance thereof.

The members voted as follows:

Ayes—Messrs. Ahlers, Baker, Behrens, Bishop, Brookfield, Corbett, Dewar, Keck, Korte, Morgan, Reinlein, Sands, Shillito, Smith, Stribley, Stoms, Twachtman, Zeigler, and President Covington—19.

Nays—Messrs. Bissell, Davis, Hill and Wieser—4.

Adjourned.

The Front Street Connection Track.**IMPORTANT MEETING OF THE RAILROAD COMMITTEE OF COUNCIL AND THE RAILROAD MAGNATES.**

A week ago yesterday the Committee on Railroads of the Council, at their meeting on that day, had before them a resolution to grant to the railroads owning and operating the connection track on Front street the privilege of using a dummy engine for the transfer of cars in the daytime. The resolution was referred to the Solicitor, and the Clerk was instructed to invite the representatives of the various railroads entering the city to meet with the committee yesterday.

The committee met yesterday, and with them were Mr. McLaren, of the C. H. & D., Mr. Ingalls, of the I. C. & L., and Mr. Gaither, representing the Little Miami road and the bridge company, and Mr. Jones, the superintendent of the connection track. Mr. Bissell occupied the chair.

The following was then read:

A resolution, supplementary to a resolution to perfect our present railroad facilities, and promote a Southern railroad connection, passed Nov. 15, 1867.

Resolved, That permission is hereby granted to the companies owning the street connection track between the Little Miami and the Indianapolis, Cincinnati & Lafayette Railroad depots to use a low pressure condensing dummy engine in the daytime, as well as at night, in drawing cars on or over said tracks; provided, that the charge made by the companies owning said connection track to all private parties, as well as to railroads and other companies within the city limits, for the transfer of cars, shall not exceed one dollar per car in either direction over said track; and provided also, that railroad companies seeking to use said connecting track shall allow the use of their own track within the city limits as a means of approach to and from the connection track and their respective depots, by all the companies and persons using the connection track; and provided, the charge made by them for the use of their track for that purpose shall not exceed pro rata as to distance of the rate herein authorized to be charged over the connection track.

And, whereas, by resolution of this Council adopted the 15th day of December, A. D. 1867, entitled a "Resolution to perfect our present railroad facilities, and promote a

Southern railroad connection," it is among other things recited that "as it may be convenient for the city to use a railroad track on Eggleston avenue, connecting with the Little Miami Railroad, in filling said avenue to its proper grade, whenever it shall decide to fill said avenue, the Little Miami Railroad Company, and the Storrs Township, New Richmond & Central Union Depot Railroad Company, as they may agree between them, shall build said track and allow the same to be used for that purpose without cost to the city."

Now, therefore, in consideration of the terms and conditions named in said resolution, and of the privileges granted, and as a condition to the enjoyment of the same, it is now here further

Resolved, That the said Little Miami Railroad Company, or its lessees, shall build the said track on Eggleston avenue, as provided in said resolution, as soon as the grade of said avenue will allow of the laying a track thereon, and in addition to the use thereof by the Little Miami Railroad Company, or its lessees for the handling of its cars, and using them in the receipt and delivery of freight and passengers, shall allow any other company operating a railroad now existing, or that may hereafter be constructed to any point within the city limits, desiring to use and occupy the said track in running their trains to and from the depot of the Little Miami Railroad Company, or to and from the track, or tracks passing to and over the Newport & Cincinnati bridge, to do so upon just and equitable terms; and if the said Little Miami Railroad Company, or companies desiring to use the same, can not agree upon the time upon which said track shall be so used, the subject matter of difference shall be referred to two arbitrators, one of whom shall be selected by the Little Miami Railroad Company, or its lessees, and the other by the company or companies desiring to use such track, who shall determine the terms and conditions upon which said track may be used and occupied, and the rate of compensation to be paid therefor; and if they can not agree, then they shall select a third arbitrator, the award of any two of which shall be final between the parties, said arbitrators to be disinterested men, experienced in railroad management; and upon same terms and conditions to build and operate one or more additional tracks upon said avenue, as fast as the business interests of the city of Cincinnati and of said railroad companies may justify or require it; provided, further, that this resolution shall not take effect until the companies owning said connection track, the Little Miami Railroad Company, or its lessees, and the Indianapolis, Cincinnati & Lafayette Railroad Companies, shall file with the City Auditor the acceptance of this resolution, and that other companies who may desire to use said track shall first file with the City Auditor their acceptances of this grant before making use of said track; and provided, also, that permission is hereby granted to the Cincinnati, Hamilton & Dayton Railroad Company to connect its tracks on Sixth street with the said connection track on Front street, at a point between Wood and Mill streets, and to that end for the purpose of constructing said connection, to lay tracks in Hoadly, Wood and Front streets, and to use the same as part of said connection track, in the manner hereinbefore provided.

After a little discussion, Mr. Ingalls asked Mr. McLaren if he proposed to cross the track of the I. C. & L., with his connection track, at a grade.

Mr. McLaren replied, "Certainly."

Then, said Mr. Ingalls, I shall certainly object to it. We have now one hundred trains running over our track at that point daily, and when the Cincinnati & Springfield road is completed, which will be next May, there will be thirty or forty more. If each of these trains is compelled to stop at the crossing of the C. H. & D., as will be the case if the latter crosses the road at a grade, it will simply be the death of the I. C. & L., for we can not handle our trains. If the C. H. & D. will cross our track by a bridge, I haven't a word to say. There is another thing. If the C. H. & D. Railroad gets the right to use our tracks in transferring freight, they will be able to use them at any time; and we are handling about as many trains now as we can in the canal bed. Still another thing. The I. C. & L. and Little Miami spent \$525,000 in building that connection track. They are willing to allow shippers to use the track in transferring freight without charge, but I think it would not be fair to allow these companies to come in and get the benefit of our investment for nothing. I would be content with the resolution with this proviso: That freight should be charged only with the absolute cost of hauling and enough to yield six per cent. on our investment. We are now paying \$31,500 every year interest on bonds issued to build that track.

Judge Matthews—The original ordinance authorizing the construction of that track through the city contains as one of the essential conditions that every other road that chooses to use it may do so on complying with the terms of the ordinance, which are to pay their portion of the original cost, and that is the condition under which the investment was made by those two companies, and they can't get rid of it. They are bound by the absolute terms of the grant whenever any railroad company can get to the track to allow them to use it on those terms.

Mr. Ingalls—That is just what we ask. We are willing to do that. But this resolution, if we accept it, provides that we shall do it for a good deal less.

Judge Matthews—That is where they tender their cars to you. But if they run their own trains over the track, they have to pay, under the original ordinance, their proportion of the investment.

Mr. Ingalls—Precisely; but, they would, of course, choose the cheapest way, and under this resolution they would tender all their cars to us, and we should be obliged to take them over for a dollar a car.

Mr. McLaren—The C. H. & D. Railroad is the only railroad running into Cincinnati now that is managed in the interests of Cincinnati. The other roads are managed by Eastern capitalists. I don't think, therefore, that we ask anything unreasonable. We are willing to put our tracks down and manage them at our own expense, and, if necessary, to bear our proportion of the connection track. Why Mr. Ingalls should object to our crossing his track at a grade, I don't know. This track being a side track, our trains will have to give way to all regular trains.

Mr. Ingalls—We can probably arrange to give you a connection with the connection track over the M. & C.

Mr. McLaren—I prefer to have an independent track.

Mr. Ingalls—Do you consider it of no consequence at all, where you are running a hundred trains a day, to have to stop each of them at a crossing.

Mr. McLaren—How are you going to help it?

Mr. Ingalls—We propose to stop your crossing it.

Mr. McLaren—If we get the right we will cross it. We have as much right as you have.

Mr. Ingalls—I say that this crossing of yours will be absolute death to the Indianapolis, Cincinnati & Lafayette road, and that you, as a railroad man, know it.

Mr. McLaren—I don't know any such thing. The Marietta & Cincinnati crosses us at Mill creek, and we don't try to stop them.

Mr. Ingalls—There is a difference in our case. Our shops are a mile and a half back of the depot, and we have to run our trains in, and then back them out, so that we shall have to cross your track twice with every train.

Col. Woolley—I have been told that the cost of the connection track was three times what it ought to have been.

Mr. Ingalls—I don't know anything about that, but I am content, if the Little Miami road will agree, to make this proposition: that I will submit all bills for the construction of the track to any three impartial umpires to go over, and then pass over the track, say what it is worth, or what ought to be paid for its cost, and then admit any other roads to share the benefit of it by sharing in the expense so ascertained.

Mr. Morgan said he did not believe Council would grant the right to the C. H. & D. to run a track down Wood street. The city had just spent \$60,000 to widen that street for the accommodation of those who wanted to haul loads over it, and he did not believe Council would grant any road the right to occupy it with another track.

On motion of Mr. Woolley, a sub-committee of three was appointed to revise the above resolutions and report them back to the committee at its next regular meeting. The Chair appointed, as such committee, Messrs. Woolley, Reinlein and Sands.

Adjourned.—*Gazette*, Nov. 28.

SMOTHERING A BURNING MINE.—Some months ago a coal mine at Mauch Chunk, Pa., caught fire. The ordinary appliances for extinguishing such fires failing, the company has adopted the plan of a chemist who has undertaken to extinguish it with ammoniacal gas. The entrance to the mine has been closed up, and in front of it works have been constructed for generating the gas and forcing it into the mine. Two barrels of sal ammoniac per day are used, and from the reports made during our visit, it is believed that the experiment will be a complete success, and that in a very short time the fire will be completely extinct. Such success will be most important in future cases of fire in coal mines; for there are cases where the fire has lasted for many years, as in the mine at Summit Hill, which will probably not be extinct until the whole vein is burned out.—*Exchange*

ASPHALTUM-LINED PIPES.—As showing the utility of asphaltum for preventing internal corrosion in iron water pipes, the *Scientific Press* says:—Sections of iron pipe laid by the Spring Valley Company for conveying water to San Francisco, which had been thus coated, (by dipping in boiling asphaltum), have been found in excellent condition after lying in the ground ten years.

Mr. W. D. Griswold, late the president of the Ohio & Mississippi Railroad, has been appointed receiver of the Cincinnati & Indianapolis Junction Railroad.

Chesapeake & Ohio Railroad.

DATTON EXTENSION.

The Means and Results.

ABSTRACT OF CITIZENS' REPORT.

The following abstract of the report of Citizens' Committee relative to the extension of the Chesapeake & Ohio Railroad to Dayton, Ohio, will be read with interest by many of our readers. The same arguments that apply to the Dayton line are also applicable to the extension of the same road to the city of Cincinnati. The committee say:

A sub-committee of three met and conferred with Mr. Huntington on these points. The road from Symmes Creek to Dayton is to be constructed and operated as one line, under one charter, to be built in the same thorough manner, with same low grades, the maximum not exceeding thirty feet to the mile, and the same easy curves, the maximum not less than 2,000 feet radius, that characterize the Chesapeake & Ohio.

So soon as the cash subscription along the line of \$850,000 shall be secured, Mr. Huntington and his associates will take the balance (\$2,150,000 of the \$3,000,000), to which the stock is limited. A bond will be put on the road not exceeding \$2,000,000. They will contract to build and equip the road and receive in payment this stock and bonds, and the entire sum needed for its early completion is already provided for. The road, when completed, will be run in the interest of the stockholders, with no express lines, no fast freight lines, no sleeping car lines, to suck up the marrow and leave the dry skeleton to the stockholders. Taking themselves so large an amount of stock, they must make it a dividend paying stock, and thus valuable, to secure any adequate remuneration for their large outlay.

The exceedingly low grades and easy curves with which the road will be constructed will enable a locomotive with cylinders 18 by 24 inches to draw a train of 50 loaded cars as easily as the same locomotive can draw a train of 20 cars on a road having 80 feet grades, thus greatly diminishing the cost of transportation. The design is by low freight tariff to stimulate traffic to the capacity of the road, and earn dividends by low rates on large amounts of traffic, rather than high rates on small amounts, believing that in this way they best promote their own interests, while serving the interest of the public. On heavy freight, coal, ore, iron and lumber, that is loaded and unloaded without expense to the road, the tariff for bauls of 100 miles and over will not exceed 1½ cents per ton per mile, and may, by the increase of business, be reduced to 1 cent per ton per mile.

Your committee, having become fully satisfied that Mr. Huntington and his associates would not only construct the road promptly, but operate it in the true interests of the stockholders and the public, which they deem identical, gave them their attention.

Second. The examination of the abundant supply and quality of coal and iron ore for domestic and manufacturing purposes.

They appointed a sub-committee of five, who, accompanied by Professor Orton, a member of the Board of State Geologists, (whose report is hereto appended) gave the subject such personal examination as to feel fully justified in saying that the projected line

of road will penetrate and command fields of coal and iron ore unsurpassed for quality, and in unlimited quantities. The Hill coal seams near Jackson are admirably situated by their position, dip, thickness and roof, for easy and cheap mining, and dumping into cars, and for house and steam purposes can not be excelled. This coal ignites readily; emits a large amount of heat; burns with a bright, cheerful blaze, with little smoke, and no soot, dust or clinkers, and very few ashes; and is as free from sulphurous gas and all unpleasant odor as wood. It is pronounced by experts to equal the best charcoal for smith purposes.

Your committee will not detain you to speak of other extensive coal fields reached by this road, in detail, but beg leave to express the confident belief, from information and personal examination, that those bordering on Symmes Creek will be found among the most valuable in this or any other State, for their extent, purity, ease of access, and their surpassing excellence for domestic use, steam, smithing, smelting ores, and manufacturing iron.

In addition to the extended coal fields in Ohio commanded by this road, through the Chesapeake & Ohio road, it will reach the superior mines of Splint and Cannel coal on the Kanawha River, in Virginia.

The iron ores of Southern Ohio have been famous for years for their quantity and quality. Over 100,000 tons per year of pig iron are now manufactured by the twenty-five furnaces near which this road passes, and its completion will greatly increase their production by offering cheap transportation both for the raw and manufactured article.

This line of road, in connection with the Dayton & Michigan Railroad, whose maximum grade is less than 40 feet, can bring the Lake Superior ores from Toledo to the rich smelting coals of Southern Ohio, and, by proper mixtures with Ohio ores, produce the best possible grades of iron, and return to Toledo coal and ore that will be invaluable to their manufacturing interests, and at any point along the line where enterprise, skill and capital can be combined, manufactures can be built up.

These ores and coal may meet at Dayton, and pig iron, bar iron, wire, nails, nuts, bolts, and railroad axles, to the extent of consumption in a circuit of fifty miles, can be successfully manufactured. The commanding of a larger circuit of trade will depend on the skill, energy and capital engaged in the manufacture. Cheap coal, say \$2 50 to \$3 00 per ton, will make cheap steam power, and cause a thousand other manufactories to spring into life, and can not fail to give new impetus to every variety of manufactures. The increase of manufactures is felt by every class of business. Activity in business gives value to real estate, the increase of which, in value, from this cause alone, in five years, will be ten times the entire sum assigned to our county.

The through business which the Chesapeake & Ohio will be able to command, added to the traffic which the diversified industry of the one-half million population, and the mineral wealth beyond computation, which this line of road will command, can not fail to make its stock among the most valuable, and must become year by year increasingly so.

Every citizen who subscribes to the amount assigned to our county to raise, receives in return a sure dividend paying stock, intrinsically and increasingly valuable, and the stimulus given to manufactories and business of every kind by the introduction of cheap coal and iron, will light up every fireside with a thrill of hope and joy and happiness.

THE GREAT RAILROAD CASE.

Decision of Chancellor Zabriskie.

THE INJUNCTION DENIED—THE DIRECTORS HAVE POWER TO LEASE.

[Concluded from page 326.]

THE CONCLUSIONS.

The conclusions thus arrived at are these

1. That the act of 1870 gives authority to the united companies to lease to a corporation of another State.

2. That their works form both connected and continuous lines with the works of the proposed lessees.

3. That the directors of these companies have power to sell or otherwise dispose of all the property of the companies, except the roads and canals and the franchises granted, without the consent of the State or of all the stockholders.

4. That they have power, by consent of the States and of a majority of the stockholders, or of any other proportion required by law, to sell, or lease, or otherwise dispose of these works, or to abandon them.

5. That a lease made by virtue of such authority is within the power delegated to the directors, and that there is in their charters no express or implied contract violated by it, and therefore the act authorizing it is not unconstitutional.

6. That the purpose for which these works are leased—the benefit and advantage of extended public highways, controlled and operated by one head, for regular and easy communication from and through New Jersey and other States—is evidently a public use for which property may be taken on compensation.

7. That even if the directors have not power to lease for a term, so as to bind the stockholders or their successors, that the leasing and delivering the works to the lessees with a stipulation and obligation to have the shares of dissenting stockholders valued and paid for, is not taking property without first making compensation.

8. That the Pennsylvania Railroad Company, the proposed lessee, has, by its charter and supplements, and the public laws of Pennsylvania, as construed by the courts of that State, power to take this lease and bind itself to all its stipulations.

There are many other reasons against making this lease, urged by counsel with great power and eloquence, which are not proper subjects for judicial consideration or action, but for that of legislators and the companies and their stockholders.

QUESTIONS NOT CONSIDERED.

Such are State policy and pride, which should not allow these works to be under the control of non-residents or of a foreign corporation. The expediency of permitting an overgrown, gigantic corporation, like another Colossus, to place one foot on our shore, with the other perhaps on the Pacific; that this lease of 999 years may impair or destroy the right of the State to take these works at cost in 1889, and that our citizens may be put to great inconvenience in being compelled to resort to courts of other States for redress of injuries suffered in this: these matters are proper subjects for the consideration of the Legislature only; that has considered and decided. Its action in this case has been in accordance with the policy of the State for

years, which has been to permit corporations of other States to lease works in this, and to construct new ones of themselves, under the impression that the expenditure of large sums of money on these works, and the increase of business which they bring here are a great advantage to the State, the works themselves being constructed and operated by authority of and subject to the laws of the State. This general policy I have no power or inclination to overrule. I need not say whether in this case I think it wisely exercised. Neither is the policy or wisdom of the surrender by the State of its right to take these roads in 1889, at cost, for my consideration. If they were, I cannot comprehend how a permission to the defendants to connect or consolidate their own business by contract, lease, or otherwise, could confer power to affect the rights of the State, even without the clear and distinct reservation of these rights contained in this act. This result could not be reached by the most liberal and latitudinarian construction, much less by the rules and strict construction which would most clearly apply. Had the State expressly authorized a lease of all the works for 999 years, the question would have been different.

The question whether the rent in this case is sufficient, and whether greater should not have been required to be paid, is exclusively for the determination of the directors and such stockholders as agree to receive it for their stock. The sufficiency of the security, the mere undertaking of the lessees with the right of re-entry, is for like determination. For property and assets of this amount intrusted to the directors of any corporation, it is not usual to require securities; they could hardly be obtained. As the charters now stand, the persons who control the corporation lessee by purchasing a bare majority of the stock of the New Jersey corporations, or by the votes of the two-thirds who assent, could be elected directors, and without sureties obtain control of the alleged \$15,000,000 of cash and convertible assets, and appropriate or squander them beyond control of any of those who dissent.

Had my views of the questions above considered been different, my determination of this application must have been the same. It has been for a long time the established rule in courts of equity, in matters of preliminary injunction, that where the right of the complainants to which the alleged injury is threatened has never been established at law, and is not to the equity judge clear or free from serious doubt, an injunction will not be granted, but the party will be left to his remedy at law. In some cases where the leaning of the judge is in favor of the right, and the intended injury is great, and if once done can never be fully remedied, the judge in his discretion, will, by injunction, retain matters *in statu quo* until the hearing of the cause, or a decision at law. Here the right on which the application is based, the right of a minority of stockholders down to the owner of a single share, to prevent all the others from making, what to them seems, an advantageous disposition of their property, has never been established at law; and were my views in favor of that right, the injury to result from a temporary violation of that right if the lease should be declared void in the end, is not so great or irreparable as to justify the exercise of that discretion in a case where it would seem so inequitable, where less than one-fiftieth of the stockholders claim to control all the others, and where full compensation is provided. If the interference of this Court should defeat the proposed arrangement, as it might, the

loss to the stockholders who consent, of a bargain which they think very advantageous, would from the extent of their interest be far preferal than that of the complainants by the refusal to enjoin.

This restriction on their action adopted by courts of equity, has been somewhat extended and definitely settled as the law in this State, by the Court of Errors, by the judgment in the case of the Morris & Essex Railroad vs Prudden, 5 C E Green, 530. The Chancellor, in that case, had assumed that Prudden, by purchase of a lot fronting on a street laid down on a map and staked out on the ground, from the owner of the tract so mapped and laid out, was entitled to have the street kept open to its full width, and that the subsequent laying out of a public highway over this street and its vacation, both by surveyors of the highways, without compensation, did not affect the right of way. These questions, the Court held, were proper to be determined by the courts of law, and that an injunction ought not to issue except in a strong and mischievous case of pressing necessity, without the right having been previously established at law. And while the opinion in that case admits that the law as to the right of way had been so established in other States, and cites a number of cases to show it, the decision of the Chancellor is reversed for this among other causes, and very consistently, without deigning to review the correctness of his conclusion, although the inference is hardly questionable, that the Court agreed with him in it. This judgment is direct authority for the position that the right of the complainant which he seeks to protect, or the principle of law on which it depends must have been settled by the courts of law of this State, or the decision of the court of equity, even if correct, will be reversed.

There has been no decision on the right of the complainants to prevent a sale or lease of these works by any court of law in this State. None is pretended. The only decision is that of the learned Master who advised the Chancellor in Kean vs Johnston.

In the first place this is only a dictum, a dictum founded on no precedent, and followed by no court. The case was expressly decided on other grounds. But the Master, whatever his standing and authority as a lawyer, was sitting in a court of equity, and not a court of law, and therefore the authority is not sufficient. This is not only to be inferred from the language of the opinion in Prudden's case, but from the case itself. The Chancellor, in his opinion, relied upon and cited the decision of the Court of Errors in the case of Holmes vs Jersey City, 1 Beas. (2), 99. In that case Holmes had purchased of Van Vorst a lot laid out on his map, under the same circumstances precisely as Prudden's purchase. The question was upon the right of the city to close part of the street.

In the opinion of the Court of Errors, delivered by Chief Justice Green, the proposition is stated at the commencement as the foundation of the claim "that the complainant who purchased under Van Vorst is entitled to the use of the entire street as dedicated." This proposition was at the foundation of the claim of Holmes; without it he had no standing at court. To this proposition the whole court assented, both by adopting the opinion and reversing the judgment of the Chancellor, who did not perhaps differ from them on this point, but his order dissolving the injunction was correct if Holmes had not this right. Six judges of the Supreme Court and five judges of the Court of Errors, also law judges, con-

curred in this judgment. But they were sitting, not as a court of law, but as a court of equity in an appeal from the Chancellor, and therefore it is properly assumed in Prudden's case, that this question had not been determined in a court of law. This must have been the main question, as the other, whether the right was lost by laying out and vacating a highway over the lands in which the easement was, could extinguish it, it is included in that so often declared by the court of law that the vacation of a highway laid out over lands, leaves the title as it was before the laying out. But both questions are included in the opinion in Prudden's case. The opinion of a Master sitting in equity could not effect what was not done by the unanimous opinion of a court of equity composed of all the law judges, sitting in equity. This doctrine has been since that decision followed by this Court in many cases, including that of the Hackensack Improvement Commission vs the New Jersey Midland Railroad Company, not yet reported.

The doctrine of acquiescence, too, as laid down and applied in Prudden's case, must deprive the complainants of the remedy by preliminary injunction. In that case the road had been located, and a track laid down in 1846 and 1847, after Prudden's purchase on the street in front of his lot, but on the side most distant from his lot. At the laying of the first track, there was nothing to intimate to Prudden that a second track would ever be required, or that the right to lay it was claimed. His only acquiescence was silence. In June, 1848, the highway was vacated by surveyors, and in December, 1848, the owners who laid out the street and sold to Prudden conveyed to the railroad company a strip in the street fifty feet wide. These facts appear in the opinion, and the judgment is founded on them. The court held that this acquiescence in laying the first track deprived him of the right to the protection of an injunction, when the same company attempted to lay another track on the same street, nearer to his lot, that seriously incommoded the access to it over the street. The doctrine of acquiescence had not before been extended, even in injunction cases, beyond the thing or erection acquiesced in, and was not held to protect further encroachments of a like nature upon other parts of the same property, or to justify in equity him "who had been suffered to take my coat in taking my cloak also," as being parcel of my apparel.

In this case the delay of the complainants in filing their bill until the terms of the contract were fully agreed upon can not be held to be acquiescence. Until they knew the terms, they could not know that they were not such as might induce them to acquiesce or consent, even if they were not bound. But the acquiescence is their consenting to or acquiescing in former encroachments of the same nature on these very rights by the Legislature and their directors. For the gist of the decision in Prudden's case is that it need not be an acquiescence in the injury then contemplated, but in a former one touching the same right. Prudden had never for a moment acquiesced in the laying of the second track; he filed his bill before any work was done. These complainants are in precisely the same situation. Some of them acquiesced in the Act of 1831, consolidating the joint companies; all, as expressly alleged in the bill (p. 30, l. 30), assented to or acquiesced in the act consolidating the United Companies, and the agreement which is confirmed. These matters were, according to the Hackensack & New

York Railroad case, greater encroachments on these rights of stockholders than the present lease.

The doctrine of acquiescence settled in Prudden's case must be applied, as it was then applied, only to affect the remedy by injunction. For that purpose, though novel, it may seem equitable. It will never answer nor was it intended to be applied to affect or change rights of property, or to claims in the courts of law. Else the owner of a lot with a house removed from the front, if he suffered his neighbor to erect a building encroaching on the lot a few feet or a few inches, would be bound by this, if that neighbor twenty years afterwards should erect a wing to this building, extending across the lot and cutting off access from the house to the street, more especially if, as in Prudden's case, there was a street by the side or rear from which a gate could be cut, and access had to an entrance to be made in the back side of the house. But such acquiescence must in this case, as in that, deprive the complainant of his remedy by injunction. That decision is the law of this Court until reversed or modified.

These views make it unnecessary for me to consider other questions presented, including that of want of necessary parties to the suit, so ably urged by the counsel who opened the argument for the defendants.

THE INJUNCTION DENIED.

The injunction must be denied, and the order restraining the defendants from executing the lease vacated. I have arrived at the above conclusions after careful investigation and deliberate reflection. The case itself is of great importance; the principles involved are still more important. I have been much aided by the able and exhaustive arguments of the distinguished counsel concerned in it. Their briefs, especially the full and elaborate brief of the opening counsel, containing a summary of the law upon the subject.

A GREAT OREGON RAILROAD.—The road for which the Oregonians are asking a land grant will place Portland within seventeen hundred miles of Omaha by a southern line. Dallas, the first point named, is eighty miles east from Portland, and on the left bank of the Columbia. The outline reported seems to indicate a purpose to turn the Blue Mountains by following the Lewis Fork or Snake River through all Eastern Oregon; thence across South-west Idaho to or near the Malade, and then striking across the head of Salt Lake at Monument. A road has been surveyed from Monument to Boise City, on the Snake River, already. The distance to the Central road is given at 588 miles. Another proposal places the southern termination 92 miles further east, at Granger, near Bryan, on the Union Pacific. This road is intended to assist settlement, being now very sparsely occupied. It explores a portion of Oregon more than 225 miles east of the Goose Lake road, and as a northern arm of the Union Pacific would apparently militate to some degree against the Northern Pacific. But eventually, and sooner than most are ready to believe, the substantial part of this outline will be carried out—subsidy or no subsidy.

— The Burlington, Cedar Rapids & Minnesota road was to be completed this week as far north as Nova Springs, Iowa, where it forms a junction with the Milwaukee & St. Paul road. It is said that as soon as this road is in running order, trains will run through between Burlington and St. Paul.

Journal of Railroad Law.

KENTUCKY COURT OF APPEALS.

Nuisance—Vendee not liable for Nuisance created by Vendor until notified to abate—Negligence.

West & Bro. vs Louisville, Cincinnati & Lexington Railroad Company From Fayette. Hardin, Judge.

Appellants, in 1865, purchased a tract of land on a branch of Elkborn creek, in Fayette county, immediately above where it is crossed by the Louisville, Cincinnati & Lexington Railroad, and subsequently built a distillery thereon. In January, 1870, their distillery was flooded by high water, occasioned, as is alleged, by the embankment of the railroad and the inadequacy of the culvert. This suit was brought by appellants to recover the damages sustained. It appears that the road bed at this place was constructed by the Lexington & Ohio Railroad Company in 1833, consisting of an embankment and a culvert for the passage of the water, with two apartments, separated by a wall in the middle; that it was never of sufficient size for the free passage of the stream when swollen, and at times caused the water above it to overflow the adjacent land. The road was subsequently sold to the State, and afterwards by it to the Lexington & Frankfort Railroad Company, and by it to the appellee. After the flooding of the distillery driftwood and dirt two feet high were found across the entrance of the culvert; but whether they were there before the flood or not is not certain from the evidence. The court below, on trial, peremptorily instructed the jury to find for the defendant.

Held—Since the erection of the nuisance in 1833, both appellants and the appellee are grantees of the land and road respectively. Though, when one who erects a nuisance conveys the land, he does not transfer the liability for the erection to the grantee, it is true that an alienee may become responsible for the continuance of a nuisance, either to a party originally affected by it, or another deriving title from him. The principle is sustained by a preponderance of authority, that in such a case the alienee or grantee does not become responsible, unless after reasonable notice, request, or remonstrance, he shall refuse to reform or abate the nuisance. (12 Modern, 635; 5 Coke, 205; 13 Conn. 303; 9 N. H. 88; Washburn's Easements, &c. 664; 1 Duv. 254.)

The court erred in excluding from the jury the inquiry as to damages caused, as alleged, by the negligence of the appellee in permitting the passage of the water through the culvert to become obstructed, and thus wrongfully contributing to the injury. The entrances of the culvert were subject to the control of the defendant as part of its road bed, and the right of the corporation to enjoy the use of its road bed as an easement carried with it a continuing correlative obligation to use reasonable care and diligence to keep the culvert unobstructed, so that detriment to the owners of the land might be avoided, so far as practicable, considering the size and structure of the culvert.

Judgment reversed.

— The Lake Shore road will be graded and ready for track laying between Sheboygan and Port Washington in two weeks' time.

Northern Texas.

WHAT ITS RESOURCES ARE—ENCOURAGEMENTS TO RAILWAY ENTERPRISE.

(Sherman Correspondence N. O. Picayune, condensed.)

All this part of Texas is very much the same. Soil—a light sandy loam, not very productive, except the bottom lands. Growth—pine, intermixed with oak, hickory and other deciduous trees. Minerals—iron in great abundance throughout, but no coal yet discovered. Stone—amorphous sandstone, highly colored with the peroxide of iron. Water—abundant, and running streams even at this period of drouth quite numerous. There are many good farms and comfortable dwellings in these counties. Leaving the great cotton highway at Snow Hill, forty miles west of Jefferson, and turning north twenty-five miles further on, I passed the first prairie I had seen. Seven miles further I again entered the timbered country, and crossed the Sulphur. Fifteen miles on I found myself in the great limestone prairie region of North and North-west Texas, the most fertile and desirable portions of the State.

Red River, Lamar, Fannin and Grayson counties are so nearly alike in physical characteristics and in progress, that a general description will apply to them all. Soil—generally black, close and adhesive, and very fertile. In the numerous groves which dot the prairie, the soil is more friable and sandy. Growth—along the streams and in the prairie groves, oak, elm, hackberry, bois d'arc, but no pine except along the western edge of Red River county which supplies the people of the western counties for 200 miles with building material. There is an abundance of stock water in the numerous timber-fringed streams. Productions, corn and cotton. Before and during the war large quantities of wheat were produced in this region, but for several years the crop has been almost a failure. The cotton crop last year was very large, but the low price of the staple, and the difficulty and expense of getting it to market, induced the planters this year to put their fields mostly in corn.

Limestone suitable for building is abundant. Generally magnesians, soft when quarried, but hardening by exposure.

TO SUM UP,

Let me say that I have been in every State and Territory in the United States, and I have seen in none of them a country more beautiful and desirable than the undulating, grove-dotted prairies of the Upper Red River. Although well settled by a thrifty and industrious population, there is still ample room. When the railroads, now being built, reach this region, heretofore kept back by its isolation, it can not fail to become one of the most populous portions of this great State. In the last two years, lands have greatly appreciated in price, but there are very few transfers taking place, as everybody is waiting for the railroads.

It is quite certain now that they will not have long to wait. The Missouri, Kansas & Texas is completed to Fort Gibson, 180 miles north of this place; and the Houston & Central will soon be completed to Corsicana, 120 miles south of here. Before this time next year this region will have direct railroad communication with the great world, from which it has heretofore been cut off. The completion of these great roads will have a very damaging effect upon the trade of Jefferson, and in some degree will injuriously affect that of New Orleans. Trade and travel will forsake the old,

edious and expensive route, and take the M., K. & T., or the Texas Central to Galveston. Already a line of daily stages is established between the termini of the roads by which passengers from here can reach St Louis in four days. The cotton from this region this season will mostly take that route.

Some of this trade, however, will still reach your city via the

TRANS-CONTINENTAL RAILROAD,

Now being built from Jefferson, through Clarksville, Paris, and the southern edge of this (Grayson) county, to form a junction with the Texas Pacific some hundred miles west of Dallas. This is the enterprise which Fremont undertook, but abandoned. It is now, however, in the hands of men who mean business—M. O. Roberts and associates; and in less than twelve months there is good reason to believe that this road will be completed to Clarksville, Red River county. As the people of Marion county voted a subsidy of \$300,000 payable on that condition, only suggested by the company itself, there is reason to think them in earnest.

Railroads in Tennessee.

McMINNVILLE, TENN., NOV. 24.

A live railroad enterprise, of vast importance to Cincinnati, is now in progress in this State.

At the sale of the interest of the State of Tennessee in various roads, recently held, the road from Tullahoma to McMinnville, 26 miles in length, was bought by the Memphis & Charleston road. At the same time it bought the Winchester & Alabama road, 39 miles in length, running from Decherd to Fayetteville, Tenn.

As the Memphis & Charleston is a live road, it does not propose to let the Pennsylvania road hold the bag for it, neither does it propose to sell out to that corporation.

The new road leaves the Memphis & Charleston at or near Huntsville, crossing the Winchester & Alabama west of Winchester. From the crossing of this road south graders are now at work. From this crossing the road runs north-east to Tullahoma; from Tullahoma to McMinnville it is in first class condition.

Graders are at work between this point and Sparta. The bridge over Collins river, 3½ miles from town, is nearly finished, and the piers for the Caney Fork bridge are under way. From this point to the Kentucky line the road will pass through White, Putnam and Overton counties. White and Overton have subscribed \$120,000 each, and Putnam will do nearly as well. There is every assurance that the road will be under contract to the State line of Kentucky by April 1, 1872.

From the State line to Danville is 75 miles, to Nicholasville 15 more, where it will strike David Sinton's road and a Cincinnati connection.

President Wicks of the Memphis & Charleston road, says his road moves one-fifth of the cotton crop of the South. The value of this immense traffic, if carried through Cincinnati, can not be over estimated.—J. J. H., in *Cin. Gazette*.

— On Friday, Nov. 24th, the first arrival of freight at Oshkosh from Milwaukee came in on the new Oshkosh & Mississippi Railroad. Four or five car loads were received, and hereafter all Milwaukee freight for that city will come by that road. Passenger trains will be put on in a few days.

Petroleum Gas as Fuel.

A hydro-carbon vapor generator has been adopted at the Penn Treaty Marine Railway, at Philadelphia, which, although hardly more than a model, 12 inches in diameter and 3 feet high, supplies the vapor fuel for generating steam in a boiler 30 inches in diameter and 30 feet long. It is simple, efficient and economical, fully illustrating that a 20-horse power engine can be run at a cost *not exceeding one dollar per day*, by using petroleum as fuel. These practical results must ere long have a great effect upon the consumption of petroleum, and on the economy of coal.

The following report of an experiment made at St. Louis, reported by the *Democrat* should be registered:

Upon invitation, a considerable number of business men and statesmen assembled at the Laclede Iron Works, St. Louis, October 24, to witness an experiment with a patent for the vaporization and utilization of crude petroleum oil, or rather a comparative test of the vaporized oil as a substitute for coal as fuel. The process, says the *Democrat*, was watched with the deepest interest. The following is given as the practical results:

	Pounds.
Total am't of iron placed in furnace.....	26,378
Am't taken out after being rolled.....	24,524
Loss	1,854
Loss on same am't of iron in coal furnace	2,901
Thus saving in iron alone by the use of gas	1,047
Which, at 3½ cents per pound, would amount to	\$36 64
Cost of fuel (gas).....	42 50
Deduct saving in iron	36 64
Cost remaining.....	\$5 86
Cost of coal to make the same amount of iron.....	24 52
Iron placed in scrap furnace.....	7,950
Taken out	7,751
Loss	199
Loss with coal 15 per cent., or... ..	1,192
Deduct loss with gas.....	199
	993
Which, at 2½ cents per pound, would amount to	\$24 82
Cost of fuel (gas).....	21 25

Saving above cost of fuel..... \$3 57
Showing the extraordinary net saving of \$18 76, or 75 per cent.

It is claimed that in a specially prepared furnace the results would have increased to a very great extent the per cent. of saving. Those present best versed in the matter expressed the conviction that in a proper furnace the same amount of gas would have generated sufficient heat to have prepared three times the amount of iron for rolling. As to time, it is also stated, in the scrap furnace less than one-half the time necessary to complete a blast with coal was required by the gas. In the ordinary preparation of a blast, the time required by coal is from an hour to an hour and a half, while by gas 30 or 40 minutes are sufficient. And besides the demonstrated economy of the gas, its cleanliness was a scarcely less important feature, as evidenced in the total freedom of the smoke stacks from smoke and cinders. "The sanguine expectations of progressive men," adds the *Democrat*, "were fully justified."

RAILROAD COMBINATION IN SOUTHERN STATES—The Washington correspondent of the Boston *Advertiser* says: The recent extensive purchases and leases of railroads in the Southern States, which were supposed to have been effected by parties connected with the Pennsylvania Company, turn out to be the work of an independent organization, controlled by Baltimore capital. Among parties concerned in the enterprise are W. I. Walters, Alexander Brown & Sons, General O'Donnell, Messrs. Thomas C. Jenkins, Horace Abbott, Thomas Kensett, George Bartlett and B. F. Newcomer, of Baltimore; M. K. Jessup & Co., D. Willis James, and Roosevelt & Son, of New York; Drexel & Co., P. A. & S. Sewall, and Whitney & Sons, of Pennsylvania, and D. James, of Liverpool. Over seven million dollars have already been expended in actual cash, and up to the present time by the purchase of stock and controlling majority in a number of the most important lines of railroad, comprising in all 1,425 miles, has been secured. Besides this, control has been obtained under a lease of 363 miles additional. The new company now controls both the main lines south from Richmond, the North Carolina roads, the chief roads of South Carolina, two main roads in Georgia, and the important lines of East Tennessee. These combined Southern lines will have direct communication north of Richmond with Washington, Baltimore, Philadelphia and New York, both through the present lines and by others to be built in friendly alliance with the new organization.

— The Sabula, Ackley & Dacotah Railroad is now in operation from Sabula, Iowa, opposite Savanna, Ill., westward to a junction with the Davenport & St. Paul Railroad at Delmar Junction, and cars are taken directly into Maquoketa over the latter road. The road is operated in the interest of the Milwaukee & St. Paul company, which is cultivating a business between Milwaukee and this part of Iowa. Already several carloads of coal and lumber have been received in Maquoketa from Milwaukee, and several loads of grain shipped from Maquoketa to Milwaukee.

— The track of the Milwaukee & Northern Railway is already laid between Cedarburg and the Milwaukee river, where the work was impeded by the construction of a bridge, which will be completed during the present week, when the work of finishing the section between that point and Plymouth will be pushed forward with all possible dispatch.

We understand that in two weeks an excursion train will leave Milwaukee for Saukville and Grafton, after which trains will run regularly to those villages. In the course of next month the line will be completed to Plymouth should the weather prove favorable to the work. In the meantime the engineers are staking out the line north of that point to Kiel, where the road strikes the south-west corner of Manitowoc county.

— A change has occurred since the period when we were colonies of Great Britain. We then were restrained by penal statutes from all industries save farming. In 1750, a hat shop in Massachusetts was declared by Parliament to be a nuisance. In the same year the Earl of Chatham said that the colonies ought not to be allowed to manufacture so much as a bob nail. In the same year the erection here of tilt hammers, slitting or rolling mills, or any manufactory of steel was forbidden by a penal act of Parliament.

GOOD RAILROAD POLICY.—The Old Colony Railroad in Massachusetts in 1868, gave a free pass to all who would build houses in the village of Wollaston Heights. The result has been that the paying passengers from that station to and from Boston are more than ten times as many now as three years ago. The whole number of these for the year ending June 30, 1860, was 3,370; for the 3 months ending August 31, 1871, they amounted to 14,300. It is remarked that railroad managers in other sections of the country might profit from this example, to the great advantage of themselves and the public.

THE MONT VISO TUNNEL.—The Mont Cenis tunnel is not the first one through the Alps. More than three hundred years ago a tunnel was built by the Marquis of Saluces, through Mont Viso, at whose foot the Po rises. It is about one-sixth as long as the Mont Cenis tunnel, and, considering the difference in the methods and implements in use, it was quite as bold an undertaking. It opens on the Italian side, at the very source of the Po, about 2,000 yards above the level of the sea, and more than 2,150 yards of its length is cut in a straight line through the solid rock in the very heart of the Alpine chain. It was intended to be used as a turnpike road, and is to this day the only direct route from Embrun to Saluces. Partly destroyed by the King of Sardinia, so as to impede the invasion of the French Republican armies, it was afterward repaired and improved by Napoleon I. Strange that such a work should have been almost forgotten, and should now be of no practical use.—*N. Y. Post.*

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RAILROAD RECORD OFFICE,

No. 167 Walnut Street, Cincinnati, Ohio.

The Railroad Record.

E. D. MANSFIELD, - - - - } Editors
T. WRIGHTSON, - - - - }
A. J. HODDER, - - - - }

CINCINNATI THURSDAY, DECEMBER 7, 1871.

The Railroad Record,

PUBLISHED EVERY THURSDAY MORNING,

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The Finances and Commerce of the Country—The Outlook.

In some recent articles we have shown the immense increase of railroads, and of railroad business, the great increase of commerce, and the relations of foreign commerce to the tariff. In all these elements we have shown that the material prosperity of the country was greater than in any former period, and that the growth of these elements is much more rapid than is the population of the country.

If we were to stop here, it is evident that all probabilities (and they are the only elements of calculation we have for the future) are in favor of a continued and still greater material prosperity. In order, however, to show the present progress of the country, and the probabilities of the future, we will make a general review of the commercial and financial statistics of the country.

The annual growth of population is on an average 33 per cent.; that is 33 per cent. in each decade—ten years. Now, if all the elements of production, commerce, currency and revenue, kept pace with the ratio of population, it would seem to be enough, and show beyond a doubt a very prosperous state of things, for no other country exhibits anything like this growth. But, in point of fact, the growth of production and commerce in this country has been far beyond that. Let us now look at the increasing volume of production, of commerce, of revenue, and of currency, and from these we can divine something of the future course of these elements.

1. *Of Production.*—There is no agricultural staple in our country which, upon the whole, is as fair a standard of agricultural production as maize (Indian corn), and we may take this as a representative element of all agricultural production. The growth of Indian corn in this country has been thus:

	Bushels.	Increase
1840.....	377,531,875	
1850.....	592,071,104	57 P ct.
1860.....	830,451,707	40 "
1870.....	1,100,000,000	33 "

In thirty years Indian corn has increased vastly beyond the increase of population; but in the last ten years has fallen to the general average of the population; but, it must be remembered that in consequence of the War the increase of population fell in the last ten years to 25 per cent., so that, in point of fact, the increase of corn in the last ten years was really at a higher rate than that of the people. But, in the meantime, new staples of agriculture have been introduced, and it is probable the aggregate of agricultural production is at a still higher rate.

As Indian corn may be taken as a representative of agricultural products, so pig iron may be taken as a representative of manufactures. The product of pig iron has been:

	Tons.	Increase.
1850.....	563,755	
1860.....	884,474	60 P ct.
1870.....	1,500,000	70 "

We see here a much higher ratio of increase in manufactures, represented by iron, than that of population or of agriculture. We see here, also, the evidence that the general manufactures of the country are rapidly increasing. This accords perfectly with what we know of the progress of society and the advance of civilization. As society grows older, and the arts improve, the civic population (that is, town people) increases much more rapidly than the rural. But as the civic people must live wholly on commerce and manufactures, three-fourths of them by the latter, it follows that manufactures must increase more rapidly in proportion than people or agriculture.

We see, therefore, that production has increased, and is increasing, at a much faster rate than the rate of population.

2. *Of Foreign Commerce.*—Some political economists regard trade, and especially foreign commerce, as the chief source of wealth, and the increase of foreign commerce as the strongest evidence of material prosperity. We do not hold that opinion; but, doubtless it is one of the evidences of prosperity, and one of the greatest evidences of the activity of production. Hence we take the increase of foreign commerce as one of the elements by which to estimate the progress of the country. The following is the totality of foreign commerce, exports and imports, for a series of decades:

1830.....	\$144,726,428
1840.....	239,227,465
1850.....	330,037,038
1860.....	661,000,000
1870.....	961,379,730

We find from this table the following rates of increase, viz:

From 1830 to 1840.....	67 P cent
" 1840 " 1850.....	40 "
" 1850 " 1860.....	100 "
" 1860 " 1870.....	50 "

We see here an average increase of over 60 per cent. in each ten years, while there is an average increase of agriculture of 43 per cent., and of manufactures of 55 per cent., and of population of 33 per cent. We see, then, the most conclusive evidence, first, that the production of food exceeds that of population; and second, that the surplus, which is fully shown in the increase of manufactures and of foreign commerce, greatly exceeds either. These elements being considered together, it is evident that there must be a rapid increase of wealth, and that fact is shown in the United States Census statistics for 1870.

3. *Of the Currency.*—The volume of currency and proportion to the people from 1820 to 1870 was as follows:

1820.....	\$45,000,000
1830.....	61,000,000
1840.....	107,000,000
1850.....	131,000,000
1860.....	145,000,000
1870.....	700,000,000

Prior to 1861, with little exception, specie payments prevailed, but there was never at any time much coin in active circulation. If we add to the above amounts one-third for the coin currency, we shall have full as much, probably more, than there was of active currency, both paper and coin, in the country. Then the whole amounts of active circulating money and the proportions to the people will stand as follows:

1840.....	\$142,400,000	8½ to each person
1850.....	174,400,000	7½ " "
1860.....	173,300,000	6 " "
1870.....	700,000,000	17 " "

We see in the above table two instructive facts: 1. From 1840 to 1860, twenty years, the proportion of currency to people was constantly diminishing; but we have seen (article 2) that commerce had in that time more than doubled. Hence the proportion of currency to the wants of society was not half as much in 1860 as in 1840, small as it was then. 2. We see, also, that in 1870 the proportion of currency to people was double that of 1840. Now, on these facts, apparently (and it is only apparent), the country has double the amount required. If we had enough in 1840, then in 1870 \$350,000,000 would not have been a correct conclusion. For (1), in 1840 there was a great depression of business and a general outcry for money, proving quite conclusively that there was not enough money in the coun-

try. (2) It is not the number of the people, but the number of transactions, the number of exchanges, which test the amount of money required in society. But on turning to article 2 we find that the aggregate foreign commerce was:

1840.....	\$239,227,465
1870.....	961,379,730
Increase.....	300 P cent.

The manufactures, represented by iron, were:

1850.....	563,765 tons.
1870.....	1,500,000 "

Increase in the last 20 years 200 P cent.

The increase of agriculture, represented by corn, was:

1840.....	377,531,875
1870.....	1,100,000,000

Increase.....200 P cent.

Putting the whole increase of business at 250 per cent. since 1840, and the result gives \$497,000,000 as the amount of active currency now required for the business of the country. But if we take into view that the amount of currency in 1840 (on which we have made this calculation) was really much less than was required for the convenient operations of commerce, we shall have reason to believe that in fact the volume of currency is now very little, if any, too large. It is farther to be observed that the premium on gold has fallen in two years from 35 to 10 per cent., no small proof that in point of fact the volume of currency is not much too great. In reviewing the currency element we should notice the fact that the public debt has been reduced since the 1st of July, 1865, five hundred millions of dollars.

Thus we see, from this review of the business of the country, that all the great elements of agriculture, commerce, manufactures, currency and credit are in the highest possible state of prosperity; and it is evident that there is no fact in the present state of things which raises a doubt or a shadow over the future. The outlook of the future, which it has been the object of this review to determine, seems more promising and bright than at any former period of our history.

— The Cairo & Fulton Railroad in Missouri is surveyed and permanently located. Mr. Nohle, the engineer in charge, states that the line is a favorable one, and that the country through which it passes far surpassed his expectations for agricultural purposes. The *Black River News* says: "The whole line can be made to yield a large and rich reward to the industrious farmer. When built this will be one of the best paying roads in the Mississippi valley. It will be the great connecting link between the Southern and Eastern plexus of railroads. It will be the road over which all the Texas cattle will be shipped, going to the Eastern markets. The larger portion of all the cotton from Texas and Arkansas, going to the East, will necessarily be shipped over this connecting link of road. We understand that it will be built without delay."

Board of Council.

FINAL PASSAGE OF THE ORDINANCE TO VACATE KILGOUR STREET AND EGGLESTON AVENUE

The ordinance to vacate Kilgour street and Eggleston avenue, from Pearl to Front street, for railroad depot and bridge purposes, was taken up.

The following communication was presented and read:

"To the Honorable President and Members of the Council:

"The undersigned citizens, tax-payers and business men of this city, would respectfully represent to your honorable body, that while the leading railroads which center here are asking for important privileges and accommodations, and there is a liberal spirit on the part of the people and Council to grant such favors, that in the act conferring such grants should be coupled provisions requiring all such railroads to so adjust their freight tariffs as not to discriminate against the business of this city."

"It is a crying evil, sadly experienced by every manufacturer and business man here, that freight of all kinds has been brought from the Eastern cities to almost every point in the West at less rates and in less time than the same kind of merchandise and manufactures would be taken by the railroads from this city to points within one hundred miles distance. This has been the case, particularly within the last two or three months, but, to a greater or less extent, has prevailed for years. Repeated efforts and appeals to the railroad authorities have been made, asking that justice be done, and that the business of this city be not discriminated against in rates of freight from as well as to us.

"These appeals have never been heeded by the railroads; but apparently the lower the rates from the Eastern cities (rates below the cost of carrying, but thus *more in favor of the Eastern cities*) so much the more exacting have been the rates, especially to local points, from this city, thus breaking down the legitimate trade of this city.

"Your petitioners make no objection to, but are in favor of, granting all reasonable facilities for railroads to transact their business here and to pass through our city; but, while granting these facilities to the railroads, wisdom dictates that the interests of this city and people be carefully guarded and secured.

"In the ordinances which are before the Council, giving certain railroad and bridge companies great privileges and property, is an opportune occasion to secure the interests of our people and city, as above set forth.

"We respectfully ask that in your legislation you thus guard the interests of this city and people.

"CINCINNATI, Nov. 30, 1871.

"James A. Frazer & Co., Smith & McAlpin, L. H. Sargent, C. M. Holloway, J. T. Warren & Co., Parker Hopple & Co., White Bros., and many others."

Mr. Loder presented a resolution declaring that the plans of improvement by the Pennsylvania Railroad Company would not afford other roads sufficient facilities for the use of Eggleston avenue, Front street, or the bridge, and directing the reference of the ordinance to the City Civil Engineer, with instructions to consult with the engineers of all the roads or companies which will require such facilities, and to report at the next meeting.

Mr. G. W. Bishop moved that the Commit-

tee on Railroads be added. He was in favor of giving the Pennsylvania Central Railroad all proper facilities, but he thought there were other roads—the Chesapeake & Ohio, for example—which would be of equal importance to Cincinnati. The Pennsylvania Central, of course, was working for its own interest. The roads were discriminating against Cincinnati. A mechanic told the speaker, yesterday, that Cincinnati mechanics could not compete with Pittsburg, for the simple reason that Pittsburg could ship freight to a point one hundred miles west of Cincinnati at lower rates than it could be shipped from this city to the same point. Cincinnati shippers feel this embarrassment continually, and he wanted, while granting to the existing roads all reasonable facilities, to protect the interests of Cincinnati.

Mr. Smith said the reason for the discrimination which had been spoken of was because the roads between here and the East were built by Philadelphia and New York, and the competition between them for the trade of the West compelled them to cut through freight rates down. As soon as Cincinnati would interest herself, and furnish capital to build roads running to the West and South which will compete with the roads operated by Eastern capitalists, the rates will come down, and the so-called "discrimination" will pass away. He would be glad if we could provide in the ordinance for everything we wanted, but he did not see any way of doing it, and he hoped the ordinance would pass in its present shape.

The motion to refer was lost, and the ordinance was engrossed.

Col. Woolley rose to make a personal explanation, first sending to the Clerk's desk the resolutions presented at the last meeting of the Committee on Railroads, and which were published at the time, in reference to the Front street connection track. He stated that he had received an assurance from the Solicitor of the Little Miami Railroad Company and the bridge company that these resolutions, if adopted by Council, would be accepted by them.

He then spoke of the insinuation by the *Commercial*, that he opposed this vacation because he had been disappointed in not obtaining employment under a money king, and denounced it as a falsehood, and the editor of the *Commercial* as a common libeler. In February last, at Col. Scott's house, in Philadelphia, he had been consulted by Col. Scott in regard to this matter, and, in consequence of a remark made by that gentleman, he had stated that he expected to be a member of Council during the coming year, and hence could not take any employment from him. He told him, however, that he approved of the project, and would do all that he could, consistent with his duty to the city, to forward it. From that time until the seizure was determined upon he was in frequent and confidential communication with the President of the bridge company, who acted in an open and perfectly honorable manner, and was informed of all the steps taken in pursuance of the plan. He said he made this statement simply to free himself from the imputation cast upon him by the *Commercial*, a journal which continually so acted as to deter good and valuable men from protecting the pockets of the people.

His only reason for wishing the passage of the ordinance delayed was in order, if possible, to get rid of the claim of Mr. Charles Kilgour.

The ordinance was then passed.

— A congress of representatives of European railroad companies is in session at Rome.

Blue Ridge Railroad.

The annual meeting of the stockholders in this road was held in Columbia last Thursday. Gen. M. C. Butler was called to preside over the meeting, and W. H. D. Gaillard, Esq., appointed Secretary. After transacting informal business, the Convention adjourned to meet on Friday, when the reports of the President, Chief Engineer, and Superintendent were submitted. We hope to publish these reports in full at an early day. On Saturday the election of Directors took place, and resulted as follows:

Gen. John A. Waggener, Mayor of Charleston; Henry Gourdin, of Charleston; Wm. J. McGrath, President of South Carolina Railroad; Andrew Simonds, President First National Bank, Charleston; George S. Cameron, President South Carolina Loan and Trust Company, Charleston; Gen. M. C. Butler, of Richmond; Gen. M. W. Gary, of Edgefield; Col. J. S. Cothran, of Abbeville; Wm. B. Gullick, Cashier of National Bank, Columbia; J. J. Patterson, Vice President Greenville and Columbia Railroad; J. B. Palmer, President Central National Bank, Columbia; Gen. J. W. Harrison, of Anderson; Thomas A. Scott, President of Pennsylvania Railroad Company; Hardy Solomons, President Loan and Trust Company, Columbia; T. J. Steers, Esq., of Oconee.

The following resolutions were offered by Col. J. S. Cothran, of Abbeville, and were unanimously adopted. Before the resolutions were submitted, it was stated that Gen. Harrison had positively declined being a candidate for re-election as President, and hence it was proper to make suitable acknowledgment of his services in that capacity, extending through the most trying period in the history of the road. We cordially indorse the sentiments expressed by the resolutions:

Resolved, That the stockholders of the Blue Ridge Railroad Company feel it due to Gen. J. W. Harrison, President, to express their sense of the integrity and perseverance with which he has for years administered the affairs of the Company, under circumstances of great difficulty and discouragement.

Resolved, That his earnest and unselfish devotion to an enterprise which they consider essential to the future prosperity of the State, deserves and receives our warmest recognition; and that in closing his official service he carries with him our sincere confidence and regard.

Resolved, That a pass for life, for himself and family, be tendered to him, as a mark of our respect.

Resolved, That the Chairman be requested to publish these resolutions in the daily papers of Charleston and Columbia, and a copy be sent to Gen. Harrison.

In response to the action of the stockholders, Gen. Harrison spoke in substance as follows:

GENTLEMEN: The passage of these resolutions have touched me deeply. I feel that my administration has been a disappointment, but you know the difficulties by which I have been surrounded; and all I feel and all I claim is, that to the best of my ability, with entire integrity, I have done the best I could. You will excuse me for saying what is personal to myself, and can not interest those to whom the future of the road is committed. In 1867 I was asked to take the Presidency of the Blue Ridge road. At that time I owned one-third of the bonded debt of the Company. Where is that debt now? I have been forced to consume what I had to live and to pay my honest

debts, and to-day the little left is what the Company still owes me on their over-due coupons. My manifest interest was to enforce the first mortgage. I declined to consent; and all that I could do with those who held first mortgage bonds was done to induce them to hold their bonds. I claim no credit. I believed this road ought to be built in the interest of the State I dearly love, and for which I have never hesitated to make any sacrifice. I believed I could build it. By the advice of the Directors, and against strong prejudices, I did not hesitate to do what I could to induce the Legislature to give us their aid. You know how that aid failed. I commit my charge to your hands, only entreating that you will use all your larger energy and ability to consummate what I to-day believe to be the great security for the future of the State. In doing so, I can say for myself and the Board over which I have presided, that we have never lost sight of one end—that if we could not build this road, the bonds of the road guaranteed by the State should neither be squandered nor stolen; and I have the satisfaction of knowing that they are yours to-day, in their integrity, to use as you best can for the welfare of the Company and the State.—*Andersonville Intelligencer*.

RAILWAY IRON.—The railway iron exported from the United Kingdom during the month of September last amounted to 93,529 tons, against 103,985 tons in September, 1870, and 76,987 tons in September, 1869. The decrease in the exports of September would have been still greater than shown in the above figures had not the American demand been so extensive. The clearances effected to the United States in September amounted to no less than 54,373 tons, as compared with 33,794 tons in September, 1870, and 14,941 tons in September, 1869. To Russia the exports showed a falling off in September to 3,764 tons, against 30,109 tons in September 1870, and 37,622 tons in September 1869. In the nine months ending September 30 this year the aggregate exports of railway iron from the United Kingdom were 756,370 tons, as compared with 862,218 tons in the corresponding period of 1870, and 697,175 tons in the corresponding period of 1869. In these totals the United States figured for 389,535 tons, against 313,410 tons in the corresponding period of 1870, and 244,086 tons in the corresponding period of 1869; Russia for 69,398 tons against 193,809 tons and 196,671 tons; and British America for 56,709 tons against 29,912 tons and 23,669 tons. The exports have increased this year to Sweden, France, Egypt, Brazil, Peru, British America, and Australia; but they have decreased to Russia, Germany, Holland, Spain, Austria, the Spanish West Indies, Chili, and British India. The value of the railway iron exported in September was £771,482, against £877,348 in September 1870, and £637,296 in September 1869; and in the nine months ending September 30 this year £6,111,781, against £7,057,730 in the corresponding period of 1870, and £5,578,447 in the first nine months of 1869.—*London Railway Times*.

—The last rail of the St. Louis, Lawrence, and Denver Railroad was laid at Lawrence on the 2d inst. The road runs from Lawrence to Pleasant Hill Mission, where it connects with the Missouri Pacific, making a direct line to St. Louis, sixteen miles shorter than by any other route. The road has been leased and will be operated by the Missouri Pacific Company.

Ballroad Progress in San Joaquin Valley.

The San Joaquin Valley branch of the Central Pacific road is being constructed at the rate of half a mile a day, southerly towards Bear creek, which is within 90 miles of Visalia. The completion of the road to Bear creek will change the current of both passenger and freight traffic between San Francisco and the southern and south-eastern counties of the State. Passengers for Visalia, Bakersfield and intermediate points in the San Joaquin valley, and mining districts in the mountains, now take stage at Gilroy, from which town to Visalia is a distance of 140 miles. The Pacheco mountain is crossed by this route, and the road over it is very rough, dangerous, steep, and very exhaustive to horse flesh. The distance over the mountain is 20 miles. When the road to Bear creek is finished, passengers will be carried to that town, and there connect with stages for Visalia and other points. Fifty miles in distance will then be saved, and a perfectly level stage road will be had. The stages and stock of the stage line, via Gilroy, have been purchased and will be used on the new route via Bear creek.

Freight to and from Kern county and the mining districts of Owens' river, Lone Pine, Kernville, Havilah, Sigeland and Kelso, has heretofore gone by sea to Los Angeles, and been carried thence by teams, over several ranges of mountains, to Bakersfield and other points. The distance from Los Angeles to Bakersfield is 150 miles; from Bear creek to Bakersfield is 160 miles. There are three mountains to cross by the former route, and high tolls are paid, while by the latter the road is free, and runs over a dead level country. The importance of the mining districts named is little understood here. One fact, however, will give the public an idea of its extent. A Frenchman in Los Angeles owns 1,200 mules, which he keeps constantly engaged in carrying goods in, and bullion or ores out of the Owens' river country. In fact, one of the main sources of the prosperity of Los Angeles has lain in its being the shipping point for the majority of those mining districts.

There are now 34 families here who are going down to settle on Government land in Kern river valley. The owner of the stage line between Visalia and Bakersfield has for their benefit reduced the fare from \$10 to \$2 each, and an effort is now being made to have the railroad and stage company between this city and Visalia display equal liberality. The extension of railroads, the settlement of Government lands, the building of irrigating canals, and the passage of a no fence law, will revolutionize the face of nature in the San Joaquin valley, which is yet destined, and that quickly, too, to be one of the richest and most reliable agricultural sections of the entire State.—*San Francisco Bulletin*, Nov. 4.

—Col. Thomas McKissock, for many years General Superintendent of the Missouri Pacific Railroad, has resigned, and A. A. Talmadge, Superintendent of the Atlantic and Pacific, will hereafter have charge of both roads, under the consolidation. Mr. Parsel, Superintendent of the Eastern Division of the Missouri Pacific Road, also resigned, and J. T. Redmond, Assistant Superintendent of the Atlantic and Pacific, will take his place. L. P. Farmer will hereafter be Assistant General Passenger Agent of both roads. Still other changes will soon be made.

The New Railroad Center of the South.

There are abundant indications that the city of Shreveport is destined to become one of the greatest and most important railroad centers in the South. Situated at the head of Red River navigation, and on the confines of the three great States of Arkansas, Louisiana, and Texas, it presents unusual facilities for becoming the great receiving and distributing port of a vast and fertile region that is only just beginning to be developed. The construction of the Texas and California Railroad is going to open up Texas, New Mexico, and Arizona to commerce and civilization, and Shreveport has all the geographical conditions necessary to enable it to become the Chicago of the South. Whether it shall attain that position in the future depends mainly on the sagacity and enterprise of its population.

The Louisiana Legislature has chartered several railroad companies that can not fail to enhance the wealth and prosperity of that city. A charter for the construction of a short line of twenty-four miles unites Shreveport with the Texas State, and connects with the richest mineral counties in that State, besides tapping the International Pacific Railroad to California. Another charter, passed last session, provides for the construction of what is known as the Carthage Branch Line, and connects Shreveport with Carthage, the center of a most important trade.

Various other projects have been formed, which will no doubt be pushed to completion, to connect Shreveport with the various trunk lines of the Southern Pacific Railroad. Most of these lines open up new sources of communication through a rich cotton region, and their construction will exercise a most important influence in developing the cultivation of that staple. It is estimated that Texas can, and probably will, at no distant date, produce more cotton than is now cultivated in the entire South. Shreveport is favorably situated for becoming the center of a vast trade in what is likely to become the greatest cotton producing region in the South. Its water communications alone would enable it, with due enterprise, to become the chief receiving and distributing port for the entire Red River valley. But by means of railroad communications it may become the center for the trade of three great States, and perhaps the extreme Southern terminus for the international trade on the Southern Pacific Railroad.—*Exchange.*

CAIRO AND ST. LOUIS AIR LINE ROAD—We find the following paragraph in the *Jonesboro Gazette* of the 4th instant:

"The contract for grading six miles of the Cairo and St. Louis Railroad, between Cairo and Jonesboro, was let the first of the week. There are some eight or ten miles of the road on the St. Louis end already graded, and a large force is at work. There are two companies of engineers on the route. Mr. Barber has charge of the North Division, from St. Louis to Marphyshoro, and Mr. McGregory from that point to Cairo. Mr. Ferguson, Chief Engineer of the Cairo and St. Louis Railroad, was in town on Thursday, and gives a favorable report of the work on the whole line. The work of construction will be prosecuted from St. Louis to Cairo as fast as it can be got ready. Davis & Merwin have the contract at Cairo for grading four miles, and Mr. Donally for two miles. The remainder of the line (nine miles), to Unity, is now open for bids from contractors."

Proposed Tunnel between Dover and Calais.

The success of the Mont Cenis enterprise has revived the long talked of project to connect Dover and Calais by a submarine tunnel. One considerable obstacle still remains to be surmounted—the formal grant of a concession from the French Government, which should surely not be difficult to obtain. The feasibility of the undertaking has been demonstrated for three years and more. Now that Mr. Hawkshaw's name is the first name appended to the proposals for boring a tunnel between Dover and Calais, the Egyptian precedent has considerable weight; and the soundness of his views as to piercing through the desert gives credit to his opinion as to burrowing under the sea. The mining engineers point to Whitehaven and Northumberland, where galleries are worked under the sea, which occupy, in their manifold turnings, many times the distance between England and France. The difference in temperature between the two ends of a tunnel is the greatest security for its ventilation; and many authorities insist that, so far from air shafts being essentials, they defeat the ends for which they are designed. The Mont Cenis tunnel, and the perfect current of air maintained there, are striking examples of what may be done without them. There are eight hundred feet in depth of chalk under the sea between Dover and Calais. Chalk can be worked as easily as a Dutch cheese. The wells at Harwick, at Dover and at Calais, are said to prove this geologically, and a new tunneling machine which was exhibited at the meeting of the British Association last year, and which the International Committee have seen at work for months upon the chalk at Snodland, near Rochester, testifies to the rest. This machine will, and does, make a hole seven feet in diameter and eighteen yards forward in the chalk strata in every twenty-four hours. This being so, what are called the driftways of the proposed tunnel, can, it is maintained, be driven in one year instead of five, as was calculated, and the enlargement and completion will follow in two or three years more. One of the favorite proposals is that there shall be two driftways and two separate tunnels, so that the trains shall always travel the same way in the same tunnel. This would not be more expensive, for the difference in cost through reduced size would fully compensate for the duplicate tunnel; and while a very short time ago ten millions was put down as the probable cost, the statistics and success of the Mont Cenis tunnel causes many competent people to reduce that figure considerably. The Mont Cenis tunnel has cost some two hundred and fifty thousand pounds a mile, with hard rock and blasting operations almost throughout. A material which can be scooped out like cheese will cost far less; and the tone of the promoters of the enterprise is that of men whose minds are thoroughly made up, but who are tolerant of opposition and incredulity because of the ignorance of the outer world. Looking at the subject by the light of recent experience and professional testimony, it is not unreasonable to hope that we may travel to and from London and Paris without leaving our railway carriage, or experiencing a qualm, before the world is many years older.—*British Trade Journal.*

—Passenger trains between Huntington and Charleston, West Virginia, on the Chesapeake Railroad, made their first regular trips on the 4th inst.

Treasurer Spinner's Annual Report.

The annual report of United States Treasurer Spinner has been published in advance of its presentation to Congress. It contains the usual important but dry statement of the receipts and payments of the public money, and abounds with evidence of the fidelity with which General Spinner discharges the responsible trust reposed in him. The worthy public functionary is so entire honest as to be entitled to a certain degree of immunity on account of his foibles. We shall therefore pass over the comparatively harmless vanity manifested in his report of his European labors for the negotiation of the Funding Loan. The Treasurer admits that he met with no success, and is so enthusiastic in his admiration of Judge Richardson's achievement in this direction, that he must be innocent of the Boutwell device for paying the Syndicate so much more for the negotiation of the loan than was authorized by act of Congress.

The following is a statement of the receipts and disbursements for the fiscal year ending June 30, 1871. It will be seen that the account includes the transfers between appropriations and expenditures:

RECEIPTS.

Bal. in treasury from last year.	\$149,502,471 60
Received, formerly credited as available.....	3,396 13
Recd f'm loans \$420,020,626 90	
" cust'ms 266,270,403 05	
From int. rev. 143,098,153 63	
" lands ... 3,383,646 68	
" war..... 22,837,092 04	
" the navy 3,203,648 42	
" interior.. 814,678 91	
" miscell's 32,165,226 80	
Total.	\$831,398,481 52
Total.....	\$980,904,349 30

EXPENDITURES.

Public debt ...	\$654,919,114 51
Army.....	98,637,083 86
Navy.....	22,634,675 63
Interior.....	42,085,571 23
Treas'y prop'r	24,259,851 98
Customs.....	17,037,452 40
Treas'y, Int'r	5,479,247 54
Int. revenue...	9,128,164 23
Diplomatic....	1,661,063 22
Quar. Salaries	708,748 84
War civ. hr'nch	924,386 11
Judiciary.....	2,911,507 51
Total.....	\$870,986,872 06

Bal in treas'y, June 30, 1871 \$109,917,477 24

Balance.....\$980,904,349 30

At the close of the last fiscal year the Treasurer held securities for total of 1,698 National Banks. During the year 141 new banks were organized. The Treasurer complains of the delays of banks in making their returns and payments of duties, and recommends Congress to enact remedial measures to check the inconvenience and loss.—*Economist.*

—The seventeenth annual meeting of the Pittsburg, Washington and Baltimore, formerly the Pittsburg and Connellsville Railroad, took place on the 4th inst. President Hughart reports the earnings for the past \$961,989 13, an increase of \$309,253 02 over 1870. The road is represented as being in a prosperous condition.

Railway and Metal Notes from Germany.

A correspondent from Berlin writes to *Engineering* as follows:

GLASS GAUGES.

An improved form of gauge has been lately introduced with a view to reduce the fracture of gauge glasses so common. By the new arrangement two tubes are employed, one fitting within the other, so as to leave an annular space around the inner tube, which is of course filled with air. These tubes are mounted in the ordinary manner, and it is found that they are far less liable to break as the inner one is protected from the sudden changes of temperature by the outer tube and the stratum of air contained in the annular space.

WARMING RAILWAY CARRIAGES.

A new method of warming railway carriages is finding favor here. A preparation of wood charcoal, nitrate of potash, and starch is employed. At first the charcoal was burnt in perforated boxes 2 ft. long, 4½ in. wide, and 2½ in. deep. However, it was found that this combustion caused violent headaches, and the charcoal was put into close iron boxes placed under the seats, a double top being employed to prevent the seats of the carriages from becoming too hot. The prepared charcoal is packed in the boxes in pieces 4 in. long, 3 in. wide, and 2 in. thick. On the line between Aix-la-Chapelle and Berlin eight pieces of charcoal were used for heating a compartment. This quantity efficiently warmed the carriage during 16 hours, and at the end of the journey the fuel was still red hot. The prepared charcoal cost 32 shillings a cwt., and the expense of heating one compartment is about three farthings an hour.

A NEW RAILWAY BALLAST.

The residuum from soda manufactories forms an excellent ballast. It is the almost universal practice to manufacture sulphur out of soda waste. After being desulphurized, the remnant consists chiefly of sulphur and carbonate of lime. Employed as ballast this material keeps the sleepers perfectly dry, and preserves the timber. Considerable experiments were conducted with it some time since, and with very marked results. Of course, its application would be limited, in consequence of the comparatively small quantity available.

CAST STEEL BRAKE BLOCKS.

Metal brake blocks, consisting of a combination of cast iron and cast steel, have come into considerable use upon German lines, with results so favorable that they will probably supersede almost entirely brake blocks of wood. They are made of charcoal iron mixed with cast steel turnings, very carefully selected and tested. It is found that if the blocks are too hard they fracture easily, and if too soft, of course, the wear is excessive. The duration is found to be considerable, and the cost less than that of wooden blocks, whilst the most important feature is the preservation of the tyres and of the permanent way. Experience lasting through two years has shown the wear upon the tyres to be extremely equal, and much less than that caused by wooden blocks, the wheels also become less heated. The reduced effect of iron blocks, as compared with those of wood, is compensated by increasing their weight.

EXTRACTION OF SULPHUR FROM IRON ORES.

A new method of treating iron ores for the separation of phosphorus consists in changing the insoluble phosphoric combinations contained in the ore into soluble phosphoric acid,

and by separating it by lixiviation. To effect this transformation the ore is treated with a combination of sulphur and oxygen. Pulverized ore containing iron pyrites is roasted as usual, and a porous ore is added which allows the infiltration of the "medicine." The prepared ore is placed in chambers of suitable dimensions, and water is then added containing sulphuric acid, or the acid is applied direct to the ore at the same time that a current of cold water is injected, so that the absorption of the sulphuric acid is effected by the water intermingled with the ore. This last mode is specially adapted to porous ores, as the gas penetrates easily into the pores, and acts more rapidly upon it. The process can be simplified by forcing the sulphuric acid into the ore by means of pumps. The fluid remains in the ore until the effect ceases, and the phosphorus has been changed into solution. It is important to observe this point exactly, and not to continue the combination, otherwise phosphate may be precipitated. The fluid is then drawn off, and replaced by water, which washes out the salt in solution, but not carried away, and the washing is continued so long as any traces of phosphoric acid are visible. The water containing the combination of phosphorus, is then heated by fire, or with a coil of steam pipes, in order to separate the sulphuric acid, and to precipitate the phosphates. The acid is either allowed to escape, or it may be used over again if it is mixed with water. The phosphorus, precipitated by the heat, is combined with lime. When the sediments have settled, the clear water is drawn out, and the precipitate is removed, and is used for various industrial purposes. The refined ore is taken out of the vessels and placed in ordinary furnaces to be reduced to pig iron.

Spanish Finances.

Repudiation in various forms is a familiar device of Spanish finance ministers. Sometimes there would be a reduction, then a postponement, and finally a downright confiscation of the debt. No country in the world has a worse financial record than Spain. In 1823 the entire of her debt was repudiated. About a dozen years afterwards they were partially recognized. The creditors were offered two-thirds of their claims in Active 5 per cent. bonds, and one-third in Passive bonds without interest. The eleven years of arrearages of dividends were converted into non-interest bearing stock, a proportion of which, determinable by lottery, was to be converted at the end of 12 years into Active 5 per cent. bonds. This arrangement, effected in 1834, was only better than nothing, but it was never fully carried out. In 1836 no interest whatever was paid. The coupons from 1837 to 1840 that should have been paid in cash, were converted in 1841 into 3 per cent. stock at par. In 1851 a new arrangement took place, involving the confiscation of half the arrears of coupons from 1841, and the conversion of the balance into a new deferred stock at interest, increasing by a sliding scale from 1 to 3 per cent. In 1867 the bondholders were laid under contribution by an ingenious device. Bonds to the amount of \$750 at 3 per cent. interest were given for each \$500 of nominal or Passive bonds, conditional on the holders paying \$140 in cash therefor.

The revolution occurred in 1868, and found Spanish finances in a deplorable condition. The government employees were not paid their salaries, and were obliged in many cases to abuse their trust in order to obtain the

means of subsistence. Even the army was not paid for months. The government did not pretend to pay the interest on the debt to home creditors, and only made spasmodic efforts to keep a doubtful faith with foreign bondholders. In November, 1868, when Queen Isabella was driven from the throne, the floating debt amounted to \$130,000,000, with an annual deficit in the budget of \$40,000,000. The Prim Government made praiseworthy exertions to extricate the country from this abyss of bankruptcy, and with results that gradually inspired new confidence in Spanish honor. The expenses were reduced, and every effort was made to equalize the income and expenditures. But the enormous deficiencies of previous years constituted a floating debt that appeared insurmountable. The taxes were increased as far as could be safely effected, and the Budget of 1871-72 really seemed to afford King Amadeus a chance to bridge over the abyss of bankruptcy that threatened his ruin. The following is a statement of the budget:

INCOME.

Direct taxes.....	\$41,365,000
Temporary taxes	8,260,000
Indirect taxes	17,725,000
Monopolies	31,000,000
National property	6,990,000
Receipts from Ultramar.....	1,000,000
Treasury profits.....	11,000,000
Total.....	\$115,340,000

EXPENSES.

Royal household	\$1,500,000
Legislative bodies	165,000
Interest on debt	51,030,000
Pensions	8,390,000
Ministerial expenses	145,000
Department of State	680,000
“ Justice	10,345,000
“ War	18,605,000
“ Marine	4,760,000
“ Interior	4,485,000
“ Public Works	5,410,000
“ Finance	20,250,000

Total.....	\$125,765,000
Deficiency.....	10,425,000

The deficiency of the present added to the deficits of former years, appear to have left the Government no alternative except to victimise the bondholders once more. An attempt was made to meet the deficiency by issuing a loan in September last. The loan was issued at 31 for a sum to be actually realized by the treasury of \$31,875,000, and involved an issue of bonds to the amount of \$100,000,000, at 3 per cent. interest. This enormous discount shows the straits of the treasury, and should have warned capitalists against investing in it. But it was readily taken, and the loan even advanced to a premium of 2@3 per cent. in London.

The total debt of Spain—real and nominal—now amounts to \$1,287,000,000, making an annual charge for interest of about \$40,000,000. This is an enormous debt for Spain, and there is not the slightest chance that it will ever be paid.

— The Vermont Central Railroad Company has leased the New London Northern Railroad from New London to Grout's Corner, near Greenfield, for which they pay \$240,000 per annum. This gives the Vermont Central a New York connection. The lease includes the three boats running from New London to New York, which are owned by the company.

Journal of Railroad Law.

Railroad Companies—Insurance Policies—When the Insured becomes responsible.

The facts in the late case of George Northup, Administrator, &c., of Lucilla Northup, deceased, v. The Railway Passenger Assurance Company (2 Lansing, 166), are fully and clearly stated in the following opinion by

J. C. SMITH, J.—By the terms of the contract in this case, the defendant undertook to insure the plaintiff against personal injury "caused by any accident while traveling by public or private conveyance provided for the transportation of passengers," &c.

The contract was expressed in an insurance policy or ticket, which was issued to the plaintiff, by the agent of the defendant, at Rathbone, Steuben county, and which the plaintiff procured with the intent of setting out on the same day, to travel by public conveyance to the county of Madison.

Immediately after procuring the ticket, the plaintiff entered upon the intended journey, in company with her husband and others, and the party traveled by cars on the Erie Railway to Elmira, and thence by cars on the Canandaigua & Elmira road to Watkins at the head of Seneca lake. From Watkins they went by steamboat on said lake to Geneva, where they arrived about eight o'clock in the evening. On landing at the steamboat wharf the party started on foot to go to the station of the New York Central Railroad Company, about seventy rods from the wharf, in further prosecution of their journey, and on the way from the wharf to the station, the plaintiff's intestate slipped and fell upon the sidewalk, and thereby received injuries of which she died in a few days.

It appears from the statement of facts submitted to the Court, that persons arriving on the steamboat generally pass from the wharf to the railroad station through the public streets of Geneva; and that upon the arrival of the steamboat, on the occasion above referred to, there were public hacks for hire at the wharf, for the purpose of conveying passengers, if hired to do so, to any part of said village, or to the railroad station.

Without undertaking to lay down any general rule, or to do anything more than to decide the particular case before us, we are of opinion, upon the facts submitted, that the accident referred to was not within the terms of the policy. The accident occurred to the plaintiff "while traveling," and that too, while traveling on the very journey which she had in view when she procured the ticket; but at the time when the accident occurred, the plaintiff was not traveling by any "public or private conveyance for the transportation of passengers," but was voluntarily pursuing her journey on foot, although there were conveyances at hand, which she might have employed, if she had chosen to do so. The defendant insured only against the perils of traveling by conveyance; and if the plaintiff had gone "by conveyance" from the wharf to the station, the accident in question could not have occurred.

The counsel for the plaintiff argues that the risk assumed by the defendant is not confined to accidents occurring during the very act of riding, but that it covers every accident happening while doing an act necessary or proper to be done, during the making of the journey included in the present case, the passing from the steamboat wharf to the railroad station, in any usual and proper mode. Accidents may be supposed, which though not occurring in the very act of riding in a convey-

ance, would be covered by the defendant's contract. The case of *Theobald v. Railway Passenger Assurance Company* (26 Eng. L & Eq R 432), cited by the plaintiff's counsel, presents an instance of that kind. In that case, the train had stopped at a station, where a change of cars took place, and the plaintiff, while stepping out of the car, met with an injury without any negligence on his part, and in consequence of the step of the car being accidentally slippery. There, as was said by Pollock, C. B., "though at the time of the accident, the plaintiff's journey had in one sense terminated by the carriage having stopped, he had not ceased to be connected with the carriage, for he was still on it. The accident also happened without negligence on his part, and while doing an act, which as a passenger must get into the carriage and get out when his journey is at an end, and can not be considered as disconnected from the machinery of motion until the time he has, as it were, safely landed from the carriage and got upon the platform. The accident is attributable to his being a passenger on the railway, and it arises out of an act immediately connected with his being such a passenger." The policy in that case insured against injuries "happening to the assured from railway accidents whilst traveling in any class carriage on any line of railway," &c., and it was held that the accident was within the meaning of the policy. But that case does not go to the extent of holding that the policy covered every accident happening to the assured while doing any act necessary or proper to be done, during the making of the journey.

The distinction between that case and the one before us is obvious. There the assured was injured while yet on the carriage in which he had made his journey, and while in the act of getting out of it, which as a passenger he must necessarily have done. Here the assured when injured was not in, on or in any way connected with any conveyance, and she was pursuing a part of her journey on foot, she having voluntarily chosen to walk, in preference to taking a carriage.

Judgment should be given for defendant.

Judgment for defendant.—*Am R R. Jour.*

Carriers—Liability for Breach of Contract

The defendant, a common carrier, received from the plaintiffs, at Goderich, in Canada, a number of cattle on its cars, under a special contract, by which it undertook to forward to Buffalo, to the consignee, "subject to their tariff and conditions expressed." In these conditions it was expressed that the owners undertook all risks of loss, injury, damage, or other contingencies, in loading, unloading, conveying, and otherwise; that the defendant did not undertake to forward the animals by any particular train, or at any specified hour, and was not responsible for the delivery thereof within any certain time, or for any particular market. The cattle were started the same day and taken a part of the distance, and had the cars containing them gone on with the train, they would have reached Buffalo the same night. Instead of this, the cars, when within sixty or seventy miles of that place, were, by a positive and peremptory order from the defendant's freight superintendent, detached from the train and placed upon a side-track, where the cattle could neither be fed nor watered, nor with any safety be unloaded, and were detained three or four days, and several of the animals perished from hunger and the inclemency of the weather, and others were greatly reduced in flesh, weakened, and otherwise injured. *Held*, 1. That according to

the conditions expressed in the special contract, the defendant could not, in this manner and for this length of time, suspend the performance of the undertaking it had thus commenced, without rendering itself liable to plaintiff for the damage occasioned by such suspension. 2. That the "conditions" did not extend to a case of damage arising from the deliberate and intentional act of the defendant or its agents, in suspending performance after it had been commenced, and refusing to perform, or allow performance, until the property, or a portion thereof, had been destroyed. In other words, that the defendant did not reserve to itself the right to perform or not, as it might afterwards elect, or to perform only as might suit its interest, convenience, or pleasure. 3. That this was not an injury arising from negligence, in any degree, but a case of an injury arising from a deliberate and intentional refusal to perform, for the time being, the undertaking of the defendant. 4. That such refusal by the defendant's freight agent to perform the contract was the act of the defendant, and the defendant was liable for the consequences, so far as his act or order had the effect to prevent performance, and thus create a breach of contract, and this whether he was authorized to make the order or not.—[*Keeney v. Grand Trunk Railway Co.*, 59 Barb.

MAYSVILLE AND LEXINGTON RAILROAD—On Monday last the Directors of the M. & L. R. R. left our city for Millersburg, for the purpose of locating a depot at that place and the transaction of other business. The site selected was at the foot of Broadway, near the McKim House; it being the wish of a majority of the citizens. It is the intention of Mr. J. W. Miller to commence immediately to build a depot, and he has already a large quantity of lumber for that purpose. It was decided by the board to push the road through vigorously to Paris, and it is thought that it can be accomplished in fifteen or twenty days.

There was a committee appointed to purchase the necessary machinery to be placed in the machine shop at this place.

There was a large crowd awaiting the arrival of the Directors and the invited guests with carriages and other conveyances. The proprietor of the McKim House had a sumptuous dinner prepared, which was greatly relished by those so hospitably entertained by him.—*Maysville Bulletin*.

—In the United States Court, sitting at Lynchburg, Va., Nov. 18th, in the injunction case of *Tyson agt The Virginia & Tennessee Railroad Company*, Mr. Baldwin closed his argument for the complainant. The Court then took a recess until 4 o'clock. Upon the reassembling, Judge Bond delivered the opinion of the Court, refusing the preliminary injunction on the ground that the Atlantic, Mississippi & Ohio company should be made a party to the suit, and granted leave to amend the bill in this respect. Judge Rives then delivered an opinion concurring with that of Judge Bond, in which he said it was clear that the stockholder, complainant, could not be forced by the act of consolidation to merge his stock, but when the proper parties are brought in he could call the Atlantic, Mississippi & Ohio company to account for its dealing with the property of the Virginia & Tennessee company.

—Mr. Wm. H. Turner has been appointed superintendent of the Portland & Rochester Railroad.

ST. LOUIS AND ST. CHARLES RAILROAD.—The St. Louis and St. Charles Railroad Company is formed for the purpose of building a road between the two cities named. The St. Charles *News* says that if the St. L. & K. Railroad is completed the two will be consolidated under one management; but, in the event of the failure of the last named road, the St. Louis and St. Charles road will be run as an independent line, or sold to the North Missouri, to give it connection with the Eastern roads, at the Union Depot, in St. Louis.—*Register*.

— The grading on the Mississippi Valley & Western Railway from Canton to Keokuk has been finished, and track laying will commence in a few days. It is expected that the road will be completed from Quincy to Keokuk by the middle of December. About 40 miles of the division running west from Canton have been graded and are now ready for the rails. The company expect to receive 2 new locomotives, 2 baggage cars, 2 passenger coaches, and 100 box cars by the first of next month.

— It is understood that the Ohio and Mississippi and Baltimore and Ohio roads will join with the Missouri Pacific and Atlantic and Pacific in the construction of a bridge at South St. Louis, and a large passenger and freight depot will soon be built on the present site of the Missouri Pacific depot, several additional squares of ground having been acquired for that purpose.

— The Louisville and Nashville and Nashville and Decatur Railroad Companies, consolidated, some time back, with the South and North Alabama, forming a line from Louisville to Montgomery, are now in treaty to lease the Montgomery and Eufaula and Brunswick and Albany Railroads, which will give them an unbroken line to Savannah and Brunswick.

— The report of the Commissioner of Internal Revenue states the aggregate receipts from all sources, exclusive of direct taxes upon land and duty upon circulation and deposits of National Banks, for the fiscal year of 1871, to be \$144,011,176. This sum includes the amounts refunded and allowed on drawbacks, amounting to \$640,488.

— The Arkansas Central Railroad Company, on the 23d ult, awarded to Andrew Frame & Co., the contract for the completion of the Pine Bluff branch from the main line to Pine Bluff, the work to begin November 1st, and be finished by February 1st, 1872. The contract for building the road from White river to Little Rock, was let to L. C. Gregg & Co., and Sharpe, Shaw & Co., all to be completed by March 1st, 1872. The contract for building a bridge over White river was let to S. B. Beaumont & Co., at \$60,000, and is to be completed by February first.

— Bibb & Co., of Virginia, late contractors on the Chesapeake & Ohio Railroad, have taken the contract to build the Big Sandy road from Lexington to Mt. Sterling. The contractors are men of energy and integrity, and work will be begun as soon as the hands and implements can be gotten together. The road is to be completed and in running order to the place by the first of next July, or as much sooner as the work can be accomplished.

— Prof. Mudge thinks that underlying the saline marshes of Kansas is a mine of pure rock salt, which can be quarried like coal, as in the mines of Cheshire, England, and Cracow, Poland.

PEORIA AND ROCK ISLAND RAILWAY.—A meeting of the stockholders of the Peoria and Rock Island Railway Company was held on the 9th ult, in Peoria. The following gentlemen were unanimously chosen directors: Ben. E. Smith, Columbus, Ohio; William Dennison, Columbus, Ohio; W. R. Hamilton, Peoria; W. H. Cruger, Peoria; H. T. Baldwin, Peoria; V. Dewein, Peoria; W. L. Wiley, Galva; O. E. Page, Cambridge, and S. F. Otman, Toulon. At a meeting of the Directors the following officers were elected: President, W. R. Hamilton; Vice President, Ben. E. Smith; Secretary and Treasurer, C. P. James; Executive Committee, W. R. Hamilton, Ben. E. Smith, Wm. Dennison, and W. H. Cruger.—*St. Louis Railway Register*.

— On Nov 22d a meeting of the stockholders of the Toledo, Wabash & Western Railway Company was held in Toledo for the purpose of taking into consideration the arrangements proposed with the Lafayette, Bloomington & Mississippi Railway Company, together with its lease with the Lafayette, Muncie & Bloomington Railway Company, the Hannibal & Central Missouri Railway Company, and the Pekin, Lincoln & Decatur Railway Company, for the lease of their several railways, which arrangements have been duly approved by the Wabash board of directors, and will be submitted to the stockholders for their approval or rejection.

— Certain taxpayers of Berkeley county, West Virginia, lately brought suit for an injunction to restrain the county supervisors from laying a tax on account of the bonds heretofore issued by them in aid of the Martinsburg & Potomac Railroad, which injunction was on the 11th inst. refused by Judge Melvin, and the validity of the bonds affirmed. This railroad connects at Williamsport with the Chesapeake & Ohio canal, will connect with the Western Maryland Railroad when it is finished, and with the Cumberland Valley Railroad, which thus gives a direct communication with the North.—*Am R. R. Jour*

— The annual election of directors of the Hannibal & St. Joseph Railroad Company, held at Hannibal on the 8th ult, was attended with unusual excitement over the contest between the Chicago, Burlington & Quincy Railroad and the Boston interests. The Toledo, Wabash & Western, Lake Shore, and New York Central, or Vanderbilt interest, carried the day by about one million six hundred thousand stock majority. Eight millions of stock were voted for a straight line through Missouri, from Hannibal, crossing over the bridge to Kansas City and St. Joseph.

— The Northern & Southern West Virginia Railroad Company was organized at Clarksburg, W. Va., on the 31st ult, with Albert L. Catlin, of Boston, as president. Stock to the amount of \$300,000 was taken, mostly by New York capitalists, and engineers are making a survey from Fairchance to Morgantown, under the direction of the Pennsylvania Railroad Company. Efforts to obtain subscriptions along the line of the proposed route are now making.

— The Fort Smith (Ark.) *Patriot* says the difficulties entangling the Little Rock & Fort Smith road are in a fair way of adjustment, and we may expect within the next thirty days to see work again recommenced on that important road.

The Babcock Extinguisher.

[From the Chicago Tribune, Jan. 24, 1871.]

The following is the official report of the fires put out by the Babcock Extinguishers belonging to the Michigan Central Railroad during the month ending January 10, 1871:

Dec. 10—Chicago & St. Louis car No. 1,038, loaded with twenty bales of cotton, left at Decatur on fire; could not get at fire in cotton with water; put out with Babcock.

Dec. 12—Water house at New Buffalo took fire; put out with Babcock Extinguisher.

Dec. 15—Coach No. 28, night express east, took fire at Detroit; put out with Babcock.

Dec. 21—Repair shop at Michigan City, took fire at 4 o'clock, A. M. from passing engines; put out with Babcock Extinguisher.

Dec. 28—Galien—Store of William J. Closson, standing near the railroad buildings, took fire at 10 A. M.; fire had attained considerable magnitude; four other buildings would have burned if this had; put out in two minutes with Babcock Extinguisher furnished to station.

Jan. 10—Lake—Wood shed took fire from engine used in sawing wood; well under way; put out in less than two minutes with Babcock Extinguisher.

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The Railroad Record.

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A. J. HODDER, - - - - }

CINCINNATI, THURSDAY, DECEMBER 21, 1871.

The Railroad Record,

PUBLISHED EVERY THURSDAY MORNING,

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Terre Haute & Cincinnati Railroad.

THE OPERATION OF FOREIGN RAILROAD CORPORATIONS IN OHIO.

General Hunter, of Indiana, recently addressed a meeting in the room of the Chamber of Commerce, in favor of the Terre Haute & Cincinnati Railroad, a road which we have noticed as having just been begun. The object of this road is to pass from Terre Haute, through Clay, Greene, Monroe, and other counties, nearly or quite fifty miles south of the present road through Indianapolis, and especially through the iron and coal districts of Indiana. Probably no road of equal length can be devised from Cincinnati which will be equally beneficial to the trade of this city. The reasons are quite obvious: 1. There is no road through a large district of country in which this road will lie. All its trade should come to Cincinnati, but Gen. Hunter says only a small part really does. The reason for this we shall presently notice. But it is a region so new and so closely connected with Cincinnati, that its whole trade ought to reach this city. As a local road through these counties, the Terre Haute & Cincinnati road would bring all the business of that country. 2. It is a section containing very superior beds of iron ore. This fact was known half a century ago. The ore beds of Greene county were worked a short time about fifty years ago; but mining could not be carried on successfully for the very reason which has arrested the rapid increase of Cincinnati, the want of railroads (properly constructed) to the best iron

and coal beds; and it is plain that Cincinnati can not have its former rapid progress till it does have such roads. 3. The road lies on one of the best coal beds in this country, the beds of block coal, and which are partially mined in Clay county. Now it is true, that about the same distance there are coal beds in Ohio, Kentucky and West Virginia as in Indiana, but there are great differences in the value of these coal beds as to quality and ease of transportation. The best coal beds which may be reached from Cincinnati by easy railroad transportation are those of Sunday creek (Perry county), of the Kanawha (West Virginia), and Clay county (Indiana), granting that the former may be reached as easily; yet it is plain that as Cincinnati extends over a great area, and is fast extending west beyond Mill creek, there will be a great advantage and probably greater cheapness, in supplying the west side of the city from Indiana. Taking into view the obvious increase of trade, and the excellency of iron and coal beds, we are justified in our remark, that probably no local road can be made from Cincinnati which will be more profitable to the city. If the Rockport and the Terre Haute roads can be made, with the Fort Wayne completed, in all of which Cincinnati interests will control, Cincinnati trade will then command commercially a large, fertile and populous district of country in northern and southern Indiana and western Kentucky. It is true that the trade of this region naturally belongs to Cincinnati, but artificial lines have counteracted nature, and a great deal of trade has been diverted from Cincinnati which ought to belong here. And now we come to some of the difficulties of Cincinnati trade, which ought to be understood and met in an honest but bold manner. Cincinnati ought to understand her own interests, and ought to take care of them. We are very glad, and so will be all intelligent citizens, to see great railroad companies, such as the Pennsylvania, the New York Central, the Erie, the Baltimore & Ohio, etc., coming to Cincinnati, constructing new entrances into the city, and expending millions of dollars. So far as this goes it is for the benefit of the city and all parties; but we may as well understand that unless these foreign corporations can be subjected to some regulation and restraint by Ohio law, they are likely to do quite as much evil as good in regard to the real interests of Cincinnati. How can they do mischief? In a very simple way, a part of which General Hunter exposed in his speech. First, these great lines are owned entirely in the East, and have no interest whatever in considering how their operation affects Cincinnati. Therefore, they use Cincinnati as a packhorse, a place of arrival and departure only. The Pennsylvania road comes to Ohio, and asks a charter to build a bridge at Cincinnati. Ohio grants it. The Pennsylvania directors begin to build their bridge without

any regard to the interests of Cincinnati. Some Cincinnati interests make a great outcry, and with or without reason compel a change. The Pennsylvania interest ask to pass through the streets of Cincinnati to get to Indiana. It is granted promptly. Then the same corporation asks to confiscate Eggleston avenue and other streets for their own benefit. It is done. The City Council of Cincinnati hesitates at nothing which can lay the city and its interests at the feet of a foreign corporation. Now what is the result of all this bowing down at the feet of Philadelphia and New York? Gen. Hunter tells you what it is exactly. Here is what he says:

"Your city, by her neglect in constructing railroads, is to-day losing a trade that in the course of a year amounts to millions, to which she is justly entitled by her position. Cincinnati ought to enjoy the greater portion of the trade of southern and central Indiana, and yet she does not get scarcely a tithe of it in my part of the State; and I attribute it almost wholly to the want of cheap transportation. Gentlemen, are you aware of the fact that your railroad system as it exists to-day is driving the trade of southern and central Indiana from your doors, and making it almost prohibitory to the merchants of that section of country from trading with you? If not, it is high time that you were learning it.

"On last Friday I went to two of the leading firms of my town (Bloomington, Indiana), and asked them the price of freights from different points to that place, and I was surprised to learn from them that they could ship goods from Baltimore to Bloomington cheaper than they could ship the same goods from Cincinnati to Bloomington, and yet the goods would pass directly through your city. I also learned from them that goods from New York to Bloomington were shipped as cheap as from Cincinnati to Bloomington. I asked them why it was so. Their answer was that from the East the competition in freights was so great that the Pennsylvania Central and Baltimore & Ohio Railroads would ship goods to Mitchell and Greencastle, points on our north and south road (the Louisville, New Albany & Chicago Railroad), cheaper than the Ohio & Mississippi and other roads would ship from Cincinnati to the same points. One of the firms, Messrs. Duun & Co., well known to your city by your grocery men, said that they had just received goods from Baltimore that averaged them from Baltimore to Mitchell twenty-nine cents per hundred pounds, and from Mitchell to Bloomington fourteen cents, making in all forty-three cents per one hundred pounds, while their goods from Cincinnati averaged them fifty cents. On all goods purchased East they got through rates, while on those purchased in Cincinnati they have to pay local rates. No city in the world could prosper under such disadvantages. If Cincinnati expects to grow in the future as she has in the past, she must reverse this order of things, and give to the people cheaper freights, for trade will go where it can buy and ship the cheapest. It may be asked, How is Cincinnati to cheapen her freights and increase her business? I answer by encouraging the building of competing lines of railroad, and in a short time she would find her present roads doing twice the business they now do, and at less than half the present rates.

That is all true, but it is not strong enough. Cincinnati should not allow a car to pass

through her streets which did not charge more for transportation to Bloomington than to Cincinnati. Does this seem illiberal? Then anything which guards our own interests is illiberal. We may as well surrender ourselves as hewers of wood and drawers of water to New York and Philadelphia, as to permit these foreign corporations to make discriminations against Cincinnati. But somebody will say, they don't do it. Don't do it!! When they charge the same for a box of goods from Cincinnati to Bloomington! This is the worst sort of discrimination; and it is one which Cincinnati has brought on herself. It is a cut-throat policy, a policy in which Cincinnati lends herself to New York and Philadelphia.

Mr. MacNeale, in his report to the Board of Trade, says that Cincinnati is not discriminated against. It only happens so. Nevertheless he admits it *does* happen so. He says:

"For this reason, freight is carried from New York to Cincinnati at a less rate than our roads can afford to carry from Cincinnati to Vincennes or Lafayette. Herein we gain. But for the same reason freight is carried from New York to Memphis for a less rate than we can contract for from Cincinnati to the same point, although the New York freight may actually pass through our city."

Now Cincinnati has a right to say on what terms these foreign corporations shall carry freight through Cincinnati; and we unhesitatingly say that this kind of business ought to be stopped. The State of Illinois has passed an act that the railroad companies which discriminate against any town or place in Illinois shall forfeit its charter. A case has arisen under this act, and it will no doubt be carried to the Supreme Court. But in time there will be a better remedy than that; the United States Government will interfere, and it will be compelled to interfere. The railroad companies in the Atlantic cities can not be restrained or regulated except by the National Government.

The Babcock Extinguisher at the Central Depot.

(From the Chicago Tribune, February 15, 1871.)

F. W. FARWELL, Secretary:

On Sunday, the 12th, at 9.20 A. M., an alarm from box 5 indicated a fire at the Central Depot. It proved to be the Pullman Palace Car "Pacific," on fire from an overheated furnace. The department was promptly on hand, but the fire was put out by a Babcock Extinguisher belonging to the P. P. C. Co.

R. A. WILLIAMS, Fire Marshal.

Chicago, Feb. 14, 1871.

Mr Spinner reports the receipts for the fiscal year, including a balance of \$149,502.471 in the treasury, June 30, 1870, were \$980,904,349; expenditures, \$870,986,872; balance in Treasury June 30, 1871, was \$109,917,477.

Reorganization of the Atlantic & Great Western Railroad.

The reorganization of the Atlantic & Great Western Railway Companies, which were sold under their mortgages last July, is now completed. The new companies entered into an agreement of consolidation, which was filed with the Secretary of State in each of the States through which the line runs, about the middle of November; and on Monday, the 11th of December, the first meeting of the Stockholders was held, and the following Board of Directors elected for the ensuing year:

Geo. B. McClellan, New York City.
William Butler Duncan, New York City.
Abram S. Hewitt, New York City.
Lloyd Aspinwall, New York City.
Lawrence Wells, New York City.
Samuel L. M. Barlow, New York City.
H. P. Sharp, London, Eng.
James McHenry, London, Eng.
George B. Wright, Meadville, Pa.
Reuben Hitchcock, Painesville, Ohio.
John Tod, Cleveland, Ohio.
James B. Hodgskin, New York City.
H. F. Sweetser, Meadville, Pa.

The new board was organized by the election of the following officers:

Geo. B. McClellan, President.
Geo. B. Wright, Vice President.
H. F. Sweetser, General Manager.
Charles Day, Secretary.
James B. Hodgskin, Treasurer.
L. L. Lockwood, Local Treasurer.
C. W. Winslow, Auditor.
John M. Oshorn, Gen. Freight Agent.
W. B. Shattuc, Gen. Passenger Agent.

We understand that the general offices are established at Meadville.

After the apathy which has apparently pervaded the line for the past two years or more, the energy displayed by the new management and the confidence which seems to be felt all through the country, are very encouraging and promise well for future success.

The men along the line and in the shops are all paid between the 10th and 20th of each month, and the officers declare their readiness and desire to pay all bills through the country for ties, fuel, lumber, etc., as promptly each month as the bills and vouchers can be prepared. Although the new managers have had the road but a few weeks, the credit of the Company already appears to be thoroughly re-established, and the confident feeling with which all speak of its future prospects must be very gratifying to those who have spent so much time and labor in effecting the present reorganization.

H. C. Lord, Esq., late president of the I. C. & L. R. R., has entered suit against the Whitewater Valley R. R., for services as President, claiming therefor the sum of \$45,000, from 1865 to 1870, with interest. The Whitewater Valley was a caudal appendage of the I. C. & L. R. R.

Fuel for Cincinnati.

(From the American Manufacturer, of Pittsburg.)

The people of Cincinnati have resolved to make themselves masters of the fuel situation by encouraging the construction of railroads from that point to Greenup county, Kentucky, about 120 miles distant. The *Record* favors the plan, and contends that experience has shown that this freight can be delivered in Cincinnati as cheaply by rail as she is now receiving coal by water. It says the railroad can not only compete with the Ohio river, but will divert the coal business from the river. This will be obvious from the consideration of certain plain facts. 1. Coal can only be carried on the Ohio river at certain seasons, not being half the year. The consequence is, that in the intervals, sometimes three or four months, the railroad can accumulate that coal at Cincinnati, forestall and command the market. 2. All the coal brought by the river must be handled at the boats and put into carts. This handling is expensive, and makes a large profit. By the railroad this is not necessary. The coal can be dumped into the cars at the mines, and dumped out again into the elevator, with comparatively little handling. 3. The losses in coal boats are, in the course of a year, very large, and by the railroad none. If the railroad be properly prepared for a coal business, it can carry coal from Greenup county, Kentucky, to Cincinnati, for less than it is carried on the river, taking all the year round.

The *American Manufacturer* is the organ of the Pittsburg industries, and is a very able and fair paper. It readily comprehends the situation and "gives it up." It is the most absurd idea in the world that a large community like Cincinnati should be dependent on a single source of supply for that most necessary article of domestic economy—fuel—when there are half a dozen fields from which to obtain it, requiring only the capital and intelligence to do so. The Kentucky & Great Eastern Railway, it can readily be shown, can deliver coal in the yards of Cincinnati at 10 cents per bushel, all the year round, and at those figures it is easy to conceive of the impossibility of creating the extreme fluctuations in price and supply to which her manufacturers and consumers are now subjected.

Indeed, nothing but that inertia and peculiar omission of concentrated and combined effort so characteristic of Cincinnati has prevented this remedy being applied long ago. Whatever individual effort can do for individual schemes or individual advancement will find as ready minds and as willing purses in Cincinnati as elsewhere. But in the great enterprises of internal improvements, requiring collective capital to make them successful, we confess that Cincinnati is as much of an old foggy, and at least as far behind many of our neighbors as was old Rip Van Winkle himself. We trust that a change is about to come over the "spirit of her dreams," and that she will soon wake up to her true position.

—The metal manufacturers of Philadelphia produced material to the value of \$37,000,000 during 1870.

Progress of the Northern Pacific Railroad.

The track is now virtually completed across the State of Minnesota, 255 miles. Contracts are let for the construction of the Dakota Division, extending two hundred miles westward, from the crossing of the Red River to the crossing of the Missouri, in Central Dakota, requiring it to be finished by the first day of July, 1872. A section of sixty-five miles is under construction between the Columbia River and Puget Sound, in Washington Territory.

It will be remembered that the Northern Pacific Company last year purchased both the main line and branch of the St. Paul and Pacific road. The main line has been completed to the Red River, at Breckinridge. Contracts are let for the continuation of the branch from its present terminus to St. Cloud, on the Mississippi River, seventy miles northward to Brainard, where it will join the trunk line of the Northern Pacific. Finally, contracts have been let for the construction of the branch road from St. Cloud to Pembina, on the British border, to be finished by December, 1872. The completion of these contracts will give the Northern Pacific Company, at the close of the next year, nine hundred miles of road in the fertile and prosperous State of Minnesota; it will carry the trunk line of the great thoroughfare nearly one-third of its distance across the continent, and will bring to the Northern Pacific road the large and profitable traffic of Montana and the Government transportation of the Upper Missouri. It is believed that this business alone, without waiting for through trade, will meet the interest on the cost of the finished portion of the road.

Owing to the rigid economy and perfect integrity with which all departments of the enterprise are managed, and the great reduction in cost of material within the last few years, the cost of construction and equipment proves to be considerably less per mile than the original estimates. For example, locomotives, which cost nineteen thousand dollars each when the Union and Central Pacific roads were built, are now sold at less than ten thousand dollars; best American rails, which during the war sold at about one hundred dollars per ton, now cost the Northern Pacific Company less than seventy dollars per ton; right of way and stone and timber material, which are usually large items in the cost of a new road, are furnished to the Northern Pacific gratuitously from the Government domain. The hearing that this greatly diminished cost of construction must have on the value and security of the company's bonds is obvious.

Steadily, and with even greater rapidity than was anticipated by its projectors, this great thoroughfare is advancing across the continent, opening as it progresses the finest belt of undeveloped country in America. Every phase of the enterprise is in the most satisfactory condition, its complete success was long since assured, and its early completion is a certainty.

TO CLEAN VESSELS OF PETROLEUM.—Thin milk of lime is recommended by Dr. Stolha as an excellent material for cleaning glass or other vessels which have been used for keeping this oil. The lime forms with the oil an emulsion, and renders it easy, especially by the addition of a slight quantity of chloride of lime, to remove even the smell of petroleum. By applying the lime warm, its action is hastened.

Railroad Progress, 1870 to 1871.

The following returns show the changes in the mileage and cost of railroads in the sections specified below, from the close of 1870 to the close of 1871:

Sec's and States.	Miles.	Cost.
New Engl'd—Maine, N. Hamp., Vermont, Massach'sts, Rhode Island and Connecticut	4,506.49	\$199,658,090
Middle States—New York, New Jersey, Pennsylvania, Delaware, Maryland & West Virginia	11,300.62	680,589,976
South'n States—Virginia, N. Carolina, S. Carolina, Georgia and Florida	6,155.70	174,519,582
Gulf & South-west'n States—Ala., Miss., Louisiana, Texas, Arkansas, Tenn. and Kentucky	6,201.25	217,348,686

Total (24 States) ... 28,164.06 \$1,272,116,334
Average cost of railroads per mile...\$45;169

An approximate estimate recently completed, and keeping in view the changes to be made up to December 31, 1871, gives the following results:

Sections.	Miles.	Cost.
New England	4,982.65	\$233,632,235
Middle States	12,321.31	783,061,509
Southern States	6,567.07	189,584,430
Gulf and South-western States	7,009.52	245,237,434
Total	30,880.55	\$1,451,515,609

Average cost of railroads per mile...\$47;186

The increase of mileage and cost in the year is shown in the following deductions:

Sections	Miles.	Cost.
New England	476.16	\$33,974,146
Middle States	1,020.69	102,471,533
Southern States	411.37	15,064,848
Gulf and South-western States	808.20	27,888,748

Total increase..... 2,716.49 \$179,399,275
Avg'e cost of inc'd mileage per mile...\$65;053

This increased cost per mile, however, is only apparent, as much of it undoubtedly belongs to expenditures on old lines and the large increase of equipment which most of the great lines have made during the year. It is scarcely probable that the new roads, on an average, have cost more than \$45,000 per mile, varying, of course, in different localities and in the quality of the roadway, appliances and rolling stock. It must also be taken into consideration that the cost as above given embraces a large mileage in progress, the cost of which is not separated in the published accounts. And yet the apparent increase in cost during the year is only, at this rate, on all the roads of \$2,104, an amount easily consumed in improvements and rolling stock, and far below the amount of extraordinary expenses on the great through lines, the increasing traffic on which has been accompanied by enlarged demands for increased facilities and accommodations. It is impossible, however, to trace the constant outgo for these purposes; and we feel satisfied of the material accuracy of the very elaborate tables compiled by us, of which the above summary gives the great result. The States

of the North-west and West will no doubt show even a larger increase in both mileage and cost proportionately to the extent of their systems. That the sections referred to have now at least as many miles of railroads as are found to exist in the 24 States above summarized, we have no doubt; nor have we the least doubt that were it possible to obtain the statistics of all the railroads in the United States that the sum of them would range from 63,000 to 65,000 miles. In 1860 the population of the United States was 31,434,466, and the length of railroads 31,769 miles, or about 1,000 persons to each mile of railroad. In 1870 the population was 38,538,180, and at the close of the year the length of railroads was 54,335 miles, or about 700 persons to each mile of railroad. That the population does not increase in the same ratio as mileage is thus certain, and that the breach has widened during the past year is not to be doubted. Notwithstanding this fact, most of our railroads are constantly increasing their traffic and making enlarged earnings. Steam power, indeed, is now the great producer and carrier. Man is simply its guardian and guide.

Tennessee Railroads.

At the sale of the interest of the State of Tennessee in various roads, recently held, the road from Tullahoma to McMinnville, 26 miles in length, was bought by the Memphis and Charleston road. At the same time it bought the Winchester and Alabama road, 39 miles in length, running from Decherd to Fayetteville, Tenn.

The new road leaves the Memphis and Charleston at or near Huntsville, crossing the Winchester and Alabama west of Winchester. From the crossing of this road south graders are now at work. From this crossing the road runs northeast to Tullahoma; from Tullahoma to McMinnville it is in first class condition.

Graders are at work between this point and Sparta. The bridge over Collins river, three and a half miles from town, is nearly finished, and the piers for the Caney Fork bridge are under way. From this point to the Kentucky line the road will pass through White, Putnam and Overton counties. White and Overton have subscribed \$120,000 each, and Putnam will do nearly as well. There is every assurance that the road will be under contract to the State line of Kentucky by April 1st, 1871.

From the State line to Danville is 75 miles, Nicholasville 15 more, where it will strike David Sinton's road and a Cincinnati connection.

THE BUSINESS OF THE SUEZ CANAL.—From the tabulation of the Austrian consul at Port Said it appears that the number of vessels which passed through the canal in the direction of Suez, during the year just passed, amounted to 292, while in the opposite direction 199 made the passage. Representing the nationality, the 491 would be divided as follows:

English	314	Spanish	3
French	74	Dutch	3
Egyptian	33	American	2
Austrian	26	Russian	2
Turkish	18	Danish	1
Italian	10	Greek	1
Portuguese	3	Zanzibar	1

The total receipts of the canal company amounted to 5,070,093 fcs.

An Improvement in Sleeping Cars.

The *Pittsburg Commercial* gives the following description of an improved sleeping car recently exhibited there, the invention of Mr. Jonah Woodruff, whose Silver Palace line of sleeping cars was absorbed about two years ago by the great Pullman company:

"The car is of the pattern known as the 'round end,' with a rotunda at either end, in which is a toilet room, containing a washstand, drinking fountain, etc., with an inner room for water closet, entirely separate. The rotundas are dome shaped, inside and outside, are beautifully frescoed, and handsomely furnished throughout. Every passenger on the coach has a right to use these apartments. The body of the car presents an extremely neat, elegant and spacious appearance. All the partitions, columns and other obstructions—in a word, all the 'lumber' which meets the eye in the ordinary sleeping coaches—are entirely done away with. By an ingenious arrangement the upper berths are taken from recesses between the seats, and the bed clothing, curtains, etc., from recesses under the seats, thus making a perfect parlor car by day and a most comfortable sleeping coach by night. On entering, the passenger sees nothing to indicate that he is in a 'sleeper,' as compared with an ordinary car, except that the seats are arranged back to back. There is an unobstructed view from end to end, and the 'burial casket' aspect of the old 'sleepers' is wholly avoided. Nor is this all. The car is better lighted, as, in addition to the ordinary window at each seat, there is a narrower light of glass between the seats, of the same length, and about half the usual width. This adds materially to both the comfort and elegance of the car. The ceiling is as high as that of the ordinary coach, giving an unobstructed view and a free circulation of air. Each car is lighted at night by three beautiful lamps, in addition to those in the rotundas. At each end of the car is a fine mirror. The mounting of the lamps, drinking fountains, washbasins, etc., is of the best nickel plating, and forms a pleasant contrast with the elegant upholstery. The car is heated from two stoves, one in each rotunda, the hot air being conveyed by a pipe, and discharged through a register."

The *Commercial* says that while these cars are quite as elegant and comfortable and as fully supplied with conveniences as the best modern sleeping cars, they weigh only twenty tons, which is ten tons less than most of the fine sleeping cars made recently. Such a saving in dead weight, it need not be said, is of very great importance, especially on railroads with heavy grades, like the Pennsylvania and the Baltimore & Ohio. Some such improvement has been very much needed, for railroads are now carrying nearly or quite 1,000 pounds per passenger in the sleeping cars than in the ordinary first class cars.—*E. R. Gazette*

The Commissioner of Internal Revenue, in his annual report for 1870, estimated that the receipts for 1871 would be \$123,418,000. The Commissioner's estimate falls below the actual receipts, the amount being \$145,374,192.

It is announced that a method has lately been devised by which the old and refuse vulcanized rubber can be mixed with fresh, in certain proportions, so as to convert the whole into one homogeneous and useful mass.

Heating Cars on German Railroads.

In Germany there are no less than thirteen different modes of warming railway passenger carriages more or less in use, though by far the greater part may be considered still as experiments, and the original plan of hot water bottles appears to be most generally adhered to, and the most practical and economical way of solving the problem. We have before us a list of fifty-five German railways, showing the means they employ for the very desirable end they have in view for the comfort of the traveling public; and while some are content to retain the use of the old fashioned portable hot water bottle exclusively, others are experimenting with three or four new methods, which will account for the difference of numbers between the above fifty-five and the hundred in the subjoined list: Hot water bottles, 39 railways; hot air, 3; heating by circulating water, 5; Fayence stoves, 1; stoves with iron jackets, 5; Schutt's patent stoves, 7; heated sand bags, 9; Berg-hausen's invention of warm boxes, 4; califores, 1; heated bricks, 3; heating by steam from the locomotives, 7; steam from separate boilers, 6; and heating with prepared coal, 10. It appears that the barbarous custom of leaving unheated the third and fourth class passenger carriages obtains almost without exception—at least the reports before us make no mention of them, and only speak of heating the first and second class carriages. With regard to the fourth class carriages, the Thuringian Railway says expressly that they are warmed by a stove; the Saarbrücken State Railway and the Hanoverian directors speak of it as "under consideration," and the Lower Silesian Branch Railway are making experiments for warming the fourth class carriages on their line with large metallic cylinders filled with hot water. Third class passengers appear to be better cared for in this respect, as we find that a heating apparatus of one kind or another is introduced on the Taunus Railway, the Nassau State Railway, the Saarbrücken, and two or three more; the Thuringian have put up stoves, as in their fourth class carriages; the Hanoverian directors have it "in contemplation." On the Brunswick State Railway "one third class carriage" has been fitted up with an iron jacket stove heated from without. The most backward in this respect is the Altona & Kiel Railway, which confesses to heating only first class compartments and occasionally some of the second class ditto with stone hottles filled with hot water.—*London Railway News*.

A NEW STREET LAMP—Mr. Skelton has invented a plan of utilizing much more of the light than is usually economized in lamps and lanterns. It is evident that the rays of light which enter the eye of a spectator on the ground form only a fraction of those given out by the flame. Those passing through the upper portion of the sides and roof are either entirely lost or, at least, but very imperfectly reflected by clouds, etc., and become visible only in the glow which hangs over a distant city. The principle of the inventor is to apply a number of reflectors, in such positions as to bend downwards and utilize the light now wasted by upward radiation. The upper half of each side of the lamp, and all of the sloping sides of the roof, are occupied by a frame in which strips of looking-glass are arranged with their reflecting surfaces downwards, in a manner analogous to the lathe of a Venetian blind. The plan is applicable to any form of lamp, and can not fail to prove serviceable.

The Glaciers of America.

INTERESTING SPECULATIONS REGARDING THEIR ORIGIN.

Prof. James D. Dana, the distinguished geologist of Yale, has just published, in the *American Journal of Science*, an interesting and valuable paper "on the position and height of the elevated plateau in which the glacier of New England, in the glacial era, had its origin." The Professor introduces his research with the remark that "the existence of a region of high elevation in Northern America as the source of a continued glacier in the glacial era has often been assumed, but rather because the glacial theory was lame without it than as a result of special research with respect to the extent and location of such a region." Prof. Dana then concisely gives the direction of the glacial furrows or scratches crossing the Green and White mountains, and shows that they could not have been made with the land of North America at its present level, and that these scratches on the rocky summit of New England point toward some great region of elevated land, on the slopes of which the stupendous glacier began its southerly motion. He gives it as his opinion that the icy plateau whence the great glacier took its departure must have existed somewhere on the western border of Hudson's bay, and that the glacier moved south-eastwardly down the valley of the Ottawa, and on the slopes to the east of it, having to this distant day the track of its course engraved deeply in the Rocky mountain flanks. With from 6,000 to 8,000 feet thickness of ice, the glacier kept on its course, guided only by the general slope of the land, but at the same time molded itself into the larger valleys and into many even of the local slopes. The intense cold that is known to have existed in the American glacial era is also naturally accounted for if the land of Northern Canada was a great plateau, being an elevation higher than the summit of Mount Washington.

The upward movement of the glacial era, which carried the north at least 5,000 feet above its present level, was followed by the slow subsidence of the "Champlain period," when the same lands sunk to a greater extent than they had previously been raised, letting down the valley of the St. Lawrence about Montreal 500 feet below its present level, and probably 1,000 feet below its glacial era level. With this sinking of the land began the melting of the glacier. Owing to the sinking of the surface in the north, northern and southern rivers had their slopes greatly lessened, and in some cases made quite level for long distances, and by vast deposits of drift the Niagara and other rivers had their channels so obstructed that they were forced to cut new passages, while other water courses of the glacial era were wholly cut off, as that from the Champlain lake down the Hudson valley. Then came the "terrace era," during which the land reached its present level, while the river channels were deepened, and the lake and river terraces which now cover the continent were formed.

The last spike was driven on the Cincinnati, Richmond & Fort Wayne Railroad, at the latter place, on the 9th inst., thereby completing a second through line to Cincinnati from Fort Wayne. A number of officials of the road, and others, were present. The road will be put in running condition at once, and through trains placed upon it.

Iron in Fire-Proof Buildings.

In the discussion which, as a result of the recent great fire, is now rife throughout the country, regarding the merits of the different building materials, the claims of iron have been, as a rule, somewhat lightly estimated. In Chicago, especially, where iron was extensively used, it did not endure the severe test of great heat as was expected, and, in consequence, has fallen somewhat into disfavor. It is probable that some buildings, composed partly of iron, would have remained standing but for the presence of that material, however thoroughly their interiors might have burned out, and it is also an established fact, that in some cases where iron shutters were relied upon to prevent the entrance of fire, they either burnt off their fastenings and fell to the ground, or the metal itself actually melted away before the intense heat.

But, though iron has disappointed many fervent advocates of its value in building, it is doubtful if the result has been so much the fault of the material as of the manner in which it was used. In the erection of buildings intended to be fire-proof iron has been employed largely, but seldom with special regard to its qualities in the event of fire; it has been used, like wood and stone, regardless of the known laws which regulate the action of this metal when subjected to the various degrees of heat.

Everybody knows that iron, when heated, will expand; and under some circumstances this expansion is so great as to produce dangerous results. In the recent great fire in Chicago, iron floors curled up like paper; beams and girders were equally affected; even the iron rails of the horse-car tracks, though not in the fire at all, were so extended by the heat from buildings on either side as to rise in many cases a foot above the track.

It will readily be seen that, unless this quality of iron is duly considered and allowance made for the action of the heat, the employment of the metal in buildings may sometimes produce disastrous results. Take, for instance, the case of an iron tie-beam. Here we have a long bar of iron extending across a building for the express purpose of holding together two walls and of counteracting the lateral pressure of other parts. A fire takes place, and the metal composing this tie-beam is subjected to intense heat. What follows? If the distance between the walls be of any extent the expansion of the iron is so great that the tie-beam is increased in length, and thrusts the walls out of the perpendicular, thus producing the very effect it was employed to prevent. In more than one well authenticated instance this has proven the case; and it will be seen that the evil is not confined to girders alone, but to any iron portion of a building where the expansion of metal could possibly displace other parts or allow fire to enter.

If, now, we can employ iron in such a manner that its expansion shall not be followed by bad results, we utilize one of the most valuable materials in forming a fire-proof structure, for to expansion alone are practically due all bad results; the conditions under which iron melts or is consumed obtain only in such rare cases as to be almost out of consideration in the construction of ordinary buildings. And to avoid the results of expansion, if sufficient attention is given to the matter, would not seem a difficult task. It is certainly possible to afford room for expansion without, as a rule, seriously detracting from the utility of the iron parts. A tie-beam will perform its

work equally well if, at its ends, a space be left where, in case of fire, it may extend without producing damage, and iron shutters might be made to overlap each other, or otherwise so arranged that when affected by heat they would not force their hinges nor fly open. These are only suggestions. Ordinary ingenuity can certainly devise means by which to provide against the effects of a quality in one class of building material which has been productive of bad results, simply because known conditions have been overlooked in the construction of our buildings. Let the attention of architects and builders be once directed to this subject, and they will readily devise ways to remedy an evil which has existed chiefly through neglect.—*Cor. Am. Builder.*

FROM THE NORTHERN PACIFIC.—George A. Brackett, Esq., returned on Thursday evening from Morehead, Fargo, and "all along the line" of the Northern Pacific. From him we gather the following facts:

There has fallen, up to the present time, over most of the line from Duluth to Red river, about one foot of snow. Owing to the fact that the snow came somewhat earlier in the season than was expected, no provisions have been made in the direction of snow plows, and as a consequence the west end of the line became somewhat unmanageable from a superfluous quantity of snow, but the whole delay from this cause did not occasion a delay of more than two days in the work of track laying. Should no unforeseen accident occur, the track will reach Morehead by the tenth of the present month.

West from the Red river grading is progressing, with a very considerable force employed. Work on the level prairie west from Fargo has been suspended for the winter, but on the Cheyenne and westward toward the crossing of the James, it is progressing rapidly, and will be pushed during the entire winter.

Several parties of engineers are at work along the line west from the James, camping in tents, and manifest no disposition to suspend labors on account of the weather. In fact the weather is by no means as cold in that northern region as has been represented.

Mr. Brackett has erected station houses along the line of the road every 20 miles between Fargo and the James river crossing with abundant accommodations for both men and animals.—*Minneapolis Tribune*, Dec. 3.

COATING WITH ZINC IN THE WET WAY.—According to M. Botger, copper or brass may be given a firmly adherent zinc coating, by the following method:

Finely divided or powdered zinc, in a non-metallic vessel, is covered with a concentrated sal-ammoniac solution; this is heated to boiling, and the articles of copper or brass, properly cleansed, are introduced. A few minutes suffices to produce a firm and brilliant coating. The requisite fineness of the zinc is produced by pouring the molten metal into a mortar and triturating the same until it solidifies.

TEMPERATURE AT GREAT DEPTHS.—The temperature in the Mont Cenis tunnel, at a depth of 5,000 feet below the surface, is about 27° C (80.6° Fahr.) This indicates a gradual increase of heat from the surface of nearly 1° Fahr. for every 100 feet of descent; a fact which conforms very well with numerous observations of a similar nature made in various other localities.

A NEW RESPIRATOR.—In a recent lecture at the Royal Institution of Great Britain, Prof. Tyndall describes a new respirator, designed for the use of firemen and others for protection against smoke and the noxious vapors evolved during combustion. In the words of the lecturer, the object of the contrivance is to place it in our power to penetrate through the densest smoke into the recesses of a house, and to rescue those who would otherwise be suffocated or burnt. As constructed, after a number of experiments, it consists of a number of strata separated from each other by wire gauze. On the partition of wire gauze at the bottom of the space which fronts the mouth, is placed a layer of cotton wool, moistened with glycerin; then a third layer of dry wool; then a layer of charcoal fragments; a second thin layer of dry cotton wool, succeeded by a layer of fragments of caustic lime. The order of succession of the layers is unessential, and may be changed without interfering with the action of the instrument. A wire gauze cover keeps the substances in place. The moistened cotton is designed effectually to arrest, by its adhesive action, the carbon particles constituting the smoke; and the charcoal, by its surface action, to condense the more dangerous and irritating vapors, mainly hydro carbons, produced by imperfect combustion. The lime is for the absorption of carbonic acid; but, in an atmosphere filled with smoke, this substance is never present in dangerous quantity, and this last layer may therefore, except in special cases (in wells, mines, etc.), be safely dispensed with.

This instrument, furnished with a suitable hood, has been thoroughly tested by the Engineer of the London Fire Department, and found completely to answer the purpose of its designer.

PHOSPHORUS BRONZE.—Some recent experiments made for a committee of the French Academy, upon the properties and the merits of the application of the new alloys containing phosphorus, seem to have resulted very favorably. One of these experiments included a bursting trial of a six-pounder cannon of phosphorus and bronze, compared with a similar gun in ordinary bronze cast at the royal foundry at Liege; the result showed that under the bursting charges the regulation piece had burst, while the new gun could still be fired with perfect safety. The bronze employed was made by adding phosphorus copper to metal coming from old guns.

From the great hardness, toughness and stability of the new compounds, as evinced by these as well as other enumerated trials, it is safe to conclude that their future applications will be very numerous. As an example of the application of the bronze in machinery, it is stated that a pair of pinions of universal rollers had been used ten months, and were finally destroyed by the wearing away of the teeth, none of them having been broken or split. It has also been successfully applied, according to our account, for the collars of hydraulic presses, eccentric rings for locomotives, pistons and bolts for steam cylinders, etc.

The last Agricultural Report places the corn crop of Kansas above that of all the other States. The averages given are: Kansas, 119; Iowa, 114; Missouri, 112; Nebraska, 112; New Hampshire, 111; Minnesota, 110; Wisconsin and Delaware, 108; Connecticut, 105; Ohio, 104; Maryland, 103; Massachusetts, the same; Arkansas and New Jersey, 102, and Rhode Island, 101.

Iron Manufacture.

A short, concise view of the present and prospective extent of the business of iron manufacture in the United States, and interesting data as to the early history of the business, is given in a paper read before the American Institute of Mining Engineers, at Troy, by David Thomas, Esq., the father of the anthracite iron manufacture in the United States. He states that in the Lehigh valley 38 furnaces produce annually 378,000 tons of pig iron, and three others now building will add 27,000 tons annually to the above. The following extract from his paper will be read with interest by all engaged in this branch of business: "Iron ore principally used is hematite, from Lehigh, Berks and Northampton counties, about 70 per cent., and about 30 per cent. from the mines of New Jersey and part from the South Mountain, Pennsylvania, and magnetic ores. Coal used is from the Lehigh Anthracite mines and from the Wyoming and Schuylkill region. The limestone is from the immediate vicinity of the furnaces. The first successful anthracite iron on the Lehigh was made in a 12-foot box furnace, at the rate of about 50 tons per week, in July, 1840. A small quantity was made at Postville in the winter of 1839, but the furnace did not succeed, was blown out, and, as far as the writer knows, the furnace at the Lehigh Crane Works, in Lehigh county, was the only anthracite furnace in blast during the year 1840. Now, I presume, the quantity made in the United States with anthracite coal must be fully 1,000,000 tons per annum. The chief difficulty I have experienced in the manufacture of pig iron, in our part of the country, is the want of experience in the men employed, as well as the difficulty of managing labor generally, more especially since the breaking out of the unfortunate war in 1861. In my opinion, it should be one of the chief studies of iron men, as well as manufacturers generally, to continue and use machinery as a substitute for manual labor, as it can be shown that of the cost of making pig iron 96 per cent. consists in labor. The abundance of coal and iron ore in this country justifies the opinion that the day is not distant when the United States will have to supply the world with the great bulk of its iron and steel, as it is now a well established fact that old countries do not possess equal iron resources in point of territory, and in many of them the resources they had have been greatly exhausted. If we notice the increase in the consumption of iron in the last one hundred years, and the increased ratio of consumption from year to year, we shall reach the conclusion that in fifty years from now it will require a large country, with large resources, to meet the wants of the world, and I know of no country that is likely to fill the wants like the United States; therefore a large portion of our mines to North, South, East and West will be called into requisition more and more, from year to year, and prosperity may be expected, if our Congress will only let well enough alone. In view of this we ought to bring our young men up well educated for the purpose, and impress upon them the need of economy in every department of the iron and steel manufacture, as it contains so many ramifications that a small waste in each of them will soon sink a large capital as no ship, however large, can sustain many leaks. W. Wilkinson writes, December 6, 1791, from the memorandum of Wm. Reynolds, of Coalbrookdale, England, that in that year England and Wales had 73 coal furnaces, making 67,548 tons of iron, an

average of 925 tons per annum for coal furnaces. Scotland had then 12 furnaces, making 12,480 tons per annum, or 1,040 tons per furnace. England had then 20 charcoal furnaces, making 8,500 tons, 425 tons per furnace yearly. Scotland had two charcoal furnaces, making 1,000 tons, or 500 each yearly. England then imported from Sweden and Russia at the rate of 70,000 tons per annum of iron, at the rate of £35 per ton. Previous to the Revolutionary War England imported a large supply of iron from New Jersey, Maryland, Virginia and Pennsylvania. Now England, after a lapse of only eighty years, makes about 5,000,000 tons per annum. In 1840, when the writer of this commenced making iron in the Lehigh Valley, Pa., the whole make of the United States did not exceed 285,000 tons per annum. In 1870, only thirty years later, the amount of iron made in this country was seven times that amount—about 2,000,000 tons—and I do not think it a vain prediction to say that in the year 1890 the production of this country will be fully double that amount."

Parkersburg Branch Railroad.

At the annual meeting of the stockholders of this company, in Parkersburg, W. Va., on the 28th ult., the directors presented the report of the operations of the road for the fiscal year ending September 30, 1871, by which it appears that the gross earnings amounted to \$733,095.34, an increase, as compared with the preceding year, of \$171,210.35, and the operating expenses, including the maintenance and improvement of the road bed and taxes, amounted to \$721,288.03, an increase of \$59,507.62 over 1870. This leaves a balance of earnings of \$11,807.31, against a deficit of \$99,895.42. The report shows that 3,927 tons, or nearly 42 miles, of new and superior rails have been laid, which required 114,495 new cross-ties. Most of the bridges have been strengthened, and in some cases have been entirely renewed, besides two or three miles of additional sidings. The road bed, in its present condition, is superior in most respects to the main stem of the Baltimore and Ohio Railroad, and, by the completion of the great Ohio River bridge, uninterrupted railroad communication is secured to the West.

MINERAL COTTON.—At the last meeting of the Franklin Institute, Mr. Coleman Sellers exhibited a sample of a material which we believe is now for the first time about to be manufactured and applied to useful purposes in the arts.

The product possesses a general resemblance to cotton wool, for which it may doubtless in certain cases be substituted with advantage, but on closer examination seems more like spun glass, which in reality it is. It is formed by allowing a jet of steam to escape through a stream of liquid slag, by which it is blown into the finest threads, sometimes two or three feet in length. These threads, though somewhat elastic, readily break up into much smaller ones, and the color of the substance being white, the appearance of a compacted mass of it makes the name under which it has been described a very appropriate one. The admirable non-conducting property of the material for heat, as well as that of the great quantity of air which it retains in its interstices, would seem to fit it very well for a non-conducting casing to steam boilers and pipes, an application for which it is at present being tested.

TESTING OF BOILERS.—A really useful and positively determinative test of competing boilers has taken place at the Fair of the American Institute, under the direction of the Committee on Engines and Boilers. Prof. R. H. Thurston (Stevens' Institute of Technology), chairman, T. J. Sloan and R. Weir, members.

Instead of weighing the water fed into the boiler and the fuel consumed, and reporting their ratio as the evaporative efficiency of the boiler, a method has been adopted that enables the committee to report the real evaporation and also the amount of water carried over, unevaporated, by the steam.

A large surface condenser has been prepared, of about 1,100 square feet of condensing surface. The steam from the boiler is blown off at a pressure of 75 pounds into this condenser, and the quantity of heat carried over by it is measured in thermal units. Should this amount be greater than would be transferred by saturated steam, it shows the steam to have been superheated; and if the amount is less than would have been necessary to fully evaporate all water passing out of the boiler, it indicates that the steam was wet, and a simple calculation gives in each case the exact weights of steam and of water passing into the condenser.

The quantity of feed and of injection water is measured by meters, the water of condensation by weighing, and the temperatures of steam, feed, injection water, water of condensation, and of discharge water from condenser, are carefully taken, and the temperature of the gases in the flues is taken by a pyrometer.

The results are reported to be very satisfactory, both as a test of this method and of the boilers competing. We shall obtain the results as soon as they are made public. They will be exceedingly interesting to engineers and to the public.

NEW SIGNAL SYSTEM.—An exchange gives the following account of a new system of signals which the Fitchburg Railroad has been trying for several weeks: A narrow box, about twelve feet high, has glasses so arranged that a white, green or red light can be shown. Immediately after the passage of every train or engine the red or danger signal is shown for six minutes in the direction from which it approached. The signal is then changed to the green or caution signal, which is shown for six minutes. The white or safety signal is then adjusted and kept in that position until the arrival of the next train or engine. When the red light is shown engines are to reduce speed to five miles an hour, and when the green is shown to ten miles an hour, until such signals are changed at other stations. When trains are dangerously close, an additional red light is to be shown at night and a red flag in the daytime. The whole system is easily managed by the station agent or gate tender, and gives much satisfaction.

PURIFYING WATER.—A process of purifying water by means of spongy iron has lately been patented in England, by G. Bischof, of Bonn. The energetic action of iron upon organic substances in solution has long been known, but its application in the form of cast iron, iron wire, etc., was without practical results, the effect being too slow. A filter of spongy iron, on the contrary, acts rapidly and thoroughly, the most offensive water immediately losing its color and smell, and keeping sweet and in a serviceable condition for a long time. The substance in question can now be had in any quantity, and at a moderate price.

The Future of England.

We published, page 245 of our second volume, an article answering the question, "When will the coal fields of England be exhausted?" and on page 61 of this volume another, entitled "Consumption of coal," in which two articles contradictory opinions were given in regard to a question which now so seriously agitates all providentially-inclined minds in Great Britain. In the first article Vivian's opinion was mentioned, which is, that that country "has coal enough for all coming times;" while in the second article Mr. Hall's opinion is given, that there is only enough left to last one hundred years more. Both of these opinions found adherents in England, and several commissions of investigation have been successively appointed to investigate and report, as we have already mentioned.

One of the last appointed has made a more thorough investigation than was made before, and the London *Mechanics' Magazine* contains the report. It says that, after carefully examining the question of the probable duration of England's coal supply, the commission has arrived at the conclusion that "if the present rate of increase in the consumption of coal continues, the progress toward exhaustion of the supply will be very rapid. This is on the supposition that the production will keep on at the same rate till the last remnant is used, and then suddenly stop; but this is improbable. First, a period of scarcity and dearth will arrive, which will prolong the duration of the coal, but, in the meantime, materially check the prosperity of the country. It will then be cheaper to import part of the coal than to raise the whole from the residual beds. However, it may be doubted whether the manufacturing supremacy of the kingdom can be maintained, after the importation of coal has become a necessity." As we have stated before (see page 62 of this volume), it is America which has coal enough to supply the world; if not for all coming times, at least for some 6,000 centuries.—*Manufacturer and Builder.*

GLASS MADE DIRECTLY FROM GRANITE—The *Baltic Journal* reports that there exists near several cities of Finland a kind of granite, called there Cupakivi, of which the composition is this: Silica, 74 per cent; feldspar, 12; oxide of iron, 3; lime, 1; alkalis, with traces of magnesia, 9. This being evidently a good compound to make glass, the first experiment was consequently made by melting 500 parts granite and 200 limestone, and a white glass was obtained. The second experiment was made with 500 granite, 150 lime and 75 of soda. This glass was more fusible and at the same time harder. Both kinds were blown without difficulty, at a bright red heat, while a dark glass was made by the addition of 70 parts of sulphate of lime or potash, and 7 parts of carbon. As there is no doubt that on our continent there is granite of a similar composition, we throw this communication out as a hint to those interested.

—An important decision as to the rights of railway stockholders in case of a consolidation with other roads, effected against their wishes, has just been rendered in the Virginia Supreme Court. The Court held that the complainant, who is a stockholder in a Southern railway, cannot be compelled to merge his stock in that of the company with which his road has been consolidated.

WELSH NARROW GAUGE RAILWAYS—A prospectus has been issued of the North Wales Narrow Gauge Railways, to be built on substantially the same system as the celebrated Festnig line. The capital will be £240,000, in 24,000 shares, of £10 each. The undertaking is designed to supply railway accommodation to districts in North Wales where none now exist. The railways will be made on the two feet gauge, as most suitable for the traffic of the localities through which they will pass, and costing much less in construction than those of the ordinary gauge. The railways will pass through some of the most romantic and attractive scenery in North Wales. It is estimated that the cost of the railway complete, including purchase of land, engines, carriages, wagons, stations, telegraph, the parliamentary and every other contingent expense, will not exceed £5,350 per mile, the working charges will not be more than 40 per cent., and the dividend payable not less than 10 per cent.—*Am Artisan.*

—The Chesapeake & Ohio Railroad Company have ordered that a branch road be built from their line on the Kanawha to the coal mines on Paint creek—a distance of 5 miles. The surveys have been made, and the road will be promptly built. The enterprise is in accordance with the plan pursued elsewhere, and determined on by the company. Where an individual or a company has a coal seam of proper value, not too far off, and will open it, the company will lay the track to the mine, thus affording the best facility for shipment to the mines, and the best encouragement to the development of the wealth of the country.

—The latest general order of the Russian minister of Public Works concerning railroads is that all railroad companies are bound to submit their locomotives, carriages, wagons and trucks to a searching examination every year, and that if the slightest flaw, particularly in the axles, be discovered, they shall be put out of use, as well as all that have traveled over 300,000 versts of railway. Another arrangement of his is that a book of complaints shall be laid out and open to the public at every station; and the station master is bound to forward copies of all such complaints on the same day to the railroad authorities, while the inspector of the line has to add his remarks, and state whether there are any reasonable grounds for the complaints made.

—A railroad bridge on the Burlington & Missouri River Railroad was burned lately, and 56 feet of it entirely destroyed. A construction train was sent to the place immediately, and in two hours and fifty minutes trains passed over the repaired bridge.

—Articles of association of the Chicago, Continental & Baltimore Railroad were filed at Indianapolis on the 8th inst. This proposed line is to pass through the counties of Lake, Porter, Laporte, Stark, Marshall, Fulton, Wabash, Kosciusko, Wells and Adams, a distance of 165 miles, in this State. The capital stock is to be \$2,000,000, and the board of directors for the ensuing year consists of the following gentlemen: D. Studebaker, J. Studebaker, S. M. Dailey, J. Roche, G. B. Bippers, J. Kenonice, Isaac Hayner, V. Gould, G. E. Darr, W. Emendoff, T. Campbell, A. A. Starr and J. G. Earl.

—The Pennsylvania Railroad has leased the Memphis & Charleston Railroad for forty-five years, guaranteeing three per cent for the first five years, then six per cent. The question of the lease will be submitted to the stockholders.

LAKE CHAMPLAIN BRIDGE—The trestle work of the new railroad bridge across Lake Champlain is 1,800 feet long, and it is intended, at intervals of 100 feet, to build piers 30 feet square at the bottom, and 12 feet by 30 at the top. The boat to be used as a drawbridge is 300 feet long, 30 wide, and 12 high, contains 250,000 feet of lumber, weighs about 300 tons, and is expected to draw 2 feet of water. 800 piles, length 80 feet, were required to build the trestle work, from either shore to the draw; this latter is to be connected to a pier by hinges, and swings back and forth like a door, by means of a chain running to the pier, and operated by a 12 horse engine.

—At the office of D. S. Major, Registrar in Bankruptcy, at Lawrenceburg, on Dec. 7th, the Ingalls party of the Indianapolis, Cincinnati & Lafayette Railroad voted claims enough to elect us assignees Messrs. Ingalls and Morris, the present receivers of the road. The Lord party was represented, but made no contest. This means, doubtless, that the road will go to a sale, within ninety days, under the agreement, that the Eastern owners and creditors will buy it in, and that there will be a change of name, a reissue of stock and bonds, and a general transformation.

—The first pier of the railroad and wagon bridge over the Missouri river, at St. Joseph, was successfully landed on its bed rock, on the 7th inst, and the sinking of the second pier will commence at once. It is expected a pier will be sunk each month until the entire four piers are based on solid rock.

—Through trains on the Detroit and Eel River Railroad have commenced running from Manchester, Indiana, to Detroit

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The Railroad Record.

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The Cincinnati Southern Railroad.

We are indebted to the kindness of some unknown friend at Frankfort for a copy of the "Act to authorize the Trustees of the Cincinnati Southern Railway to acquire the right of way, and to extend a line of railway through certain counties in this Commonwealth," which has been introduced into the Kentucky Legislature during the past week.

It is literally, we believe, the last act which was before the Legislature last winter, and passed in the House but defeated in the Senate.

The preamble to the act recites, that by an act passed by the Ohio Legislature on the 4th of May, 1869, Miles Greenwood and others of Cincinnati, were appointed Trustees, with power to borrow ten millions of dollars in the name of the said city, and expend the same in procuring the right of way, and constructing a railroad and line of telegraph between the city of Cincinnati and the city of Chattanooga in Tennessee, and "with other powers in the said act expressed."

Then follows section first of the act:

"SECTION 1. Be it enacted &c., That the said Board of Trustees, namely: Miles Greenwood, Richard M. Bishop, William Hooper, Philip Heidlebach and Edward A. Ferguson, and their successors, by the name of the Trustees of Cincinnati Southern Railway, be and they are hereby authorized, to extend, construct and maintain within the Commonwealth of Kentucky the said line of railway, with a single or double track, with all the usual appendages, including a line of telegraph, and to exercise the powers vested in them under and by virtue of said act of the General Assembly of Ohio, subject to the provisions and restrictions in this act provided."

Whatever may be the merits of the proposed scheme of a railway, certainly this mode of legislation is not well calculated to commend

it to the intelligent and considerate men of Kentucky. In the preamble to the act introduced into the Kentucky Legislature, reference is made to the Ohio law known as the "Ferguson bill," but the most important provisions of the Ohio law are not recited, or ever referred to, except in the general words "other powers in said act expressed." In the first section of the act, which we have quoted above in full, the Trustees of Cincinnati are authorized to construct and maintain the road, and also "to exercise the powers vested in them under and by virtue of the said act of the General Assembly of the State of Ohio."

Thus, it is proposed to pass an act by the Legislature of Kentucky, authorizing five citizens of the city of Cincinnati to exercise in Kentucky certain powers vested in them by law of the State of Ohio, without defining what those powers are, or reciting them in the act, or placing them upon our State records in any way so that the public can have information as to their nature or extent. There is not one word in the whole proposed act of the Kentucky Legislature, from the first letter of the preamble to the last letter on the last page of the act, which shows what these powers are the Legislature is about to authorize the Trustees of Cincinnati to exercise in Kentucky. The "Ferguson bill," which the act of the Legislature of Kentucky proposes to put in force in Kentucky, is not set out in the act nor placed upon record in any of the archives of the State, or even made public for the information of the people by printing it with the journals in the newspapers of the State.

If the proposed act should pass the Legislature and become the law of Kentucky, it will present the anomaly of enacting and putting in force in this State a law of the State of Ohio, without reciting it or in any manner placing it upon the State records for the information of the public. It would be a law of another State put in force and made operative in our own, but to be found only in the statutes of the State by which it was originally enacted.

Ought not the public to know what these powers are which the Legislature is asked to authorize the Cincinnati Trustees to exercise in Kentucky? They are not such as the Legislature of Kentucky has ever thought it wise to confer upon citizens of our own State, and we shall be greatly astonished if the present Legislature confers them upon the Cincinnati Trustees, in the unusual and clandestine manner attempted in the bill now before the House.

We clip the above from that usually fair and liberal paper the Maysville *Bulletin*, and regret to see either a manifestation of illiberality, or a disposition to pervert the public mind in reference to a great public enterprise on the part of a journal of its standing, and really counter to the interests of its own people.

In the first place, the bill referred to and now before the Kentucky Legislature, is virtually a bill of guards and not of grants, and we defy the editor of the *Bulletin*, or any other man, to point out a single act of the Kentucky Legislature granting the semblance of a franchise, in which the interests and rights of the people of Kentucky are half as well guarded as in this. The Trustees, it should be remembered, do not ask for a charter, they merely ask the right to construct and operate a rail-

way under a charter which they now have, within the territory of the State of Kentucky, and subject entirely, so far as their property is within the State of Kentucky, to Kentucky laws, Kentucky taxes and the Kentucky courts.

That the method of legislation in the Kentucky Legislature is a mere reference to the act of a sister State is not new, the *Bulletin* must be well aware. We could cite him to dozens of that class. We will quote but one or two. First from chapter 775, page 426 of laws of Kentucky, 1855—60, "An act to incorporate the Mississippi River Railway Company," approved February 28, 1860.

The act reads:

"WHEREAS, The General Assembly of the State of Tennessee, on the 29th of January, 1858, and at the first session of the thirty-second General Assembly of said State, for the years 1857—58, passed an act entitled 'An act to charter the Greenville and North Carolina Railroad Company, to amend the charter of the Eagleville, Unionville and Shelbyville Turnpike Company, and for other purposes;' and whereas, a portion of said act constitutes John S. Stanton, Thomas L. Sullivan, John D. Williams, William D. Ferguson and Jesse Moore, of Shelby county, Tennessee; and John T. Fields and William G. Fields, of Dyer county, Tennessee, a body corporate, under the name and style of the "Mississippi River Railway Company;" and whereas, said Mississippi River Railway Company are empowered to operate under their said incorporation within the limits of Kentucky only by and with the concurrence of the General Assembly of Kentucky; therefore,

SEC. 1. Be it enacted by the General Assembly of the Commonwealth of Kentucky, That the said act of the General Assembly of Tennessee, so far as it relates to the said Mississippi River Railway Company, be, and the same is hereby concurred in and re-enacted in all its sections and details (except as hereinafter provided for), so far as the said railway company in said act of incorporation propose to construct their road and operate within the limits of this State; said company shall possess all the powers and privileges, and be subject to all the limitations, liabilities and responsibilities within this State which are now or may hereafter be prescribed by the laws of Kentucky, and which are prescribed by said act of incorporation in reference to their operation within the State of Tennessee; *Provided, however,* That this General Assembly does not concur in but rejects the 50th, 51st, 52d, 53d, 54th, 55th, 56th and 57th sections of said act, as those sections are numbered in the act as it appears in the published private acts of the General Assembly of Tennessee, at the aforesaid first session of the thirty-second General Assembly of that State.

"SEC. 2. That the 38th, 39th, 40th, 41st, 42d and 43d sections of an act of the General Assembly of Kentucky, entitled 'An act to incorporate the Licking and Lexington Railroad Company, and Louisville and Frankfort Railroad Company,' approved March 1st, 1847, so far as the same are applicable to the object and intent of the incorporation of said Mississippi River Railway Company, are hereby adopted and enacted as a part of this act; and all the powers and privileges granted, and the restrictions and liabilities imposed in said sections upon the said Licking and Lex-

ington, and Louisville and Frankfort Railroad Companies, are hereby granted to and imposed upon the Mississippi River Railway Company, so far as it operates within the limits of the State of Kentucky.

But lest it should be contended that this is an antiquated act, passed when the relations of "sovereign States" toward each other were not properly understood, let us quote one of more recent date. We quote from Laws of Kentucky, vol. 1, page 21, acts of 1871:

AN ACT to authorize the St. Louis and Iron Mountain Railroad Company to extend their railroad through the city of Columbus.

Be it enacted by the General Assembly of the Commonwealth of Kentucky:

SECTION 1. That it shall and may be lawful for the St. Louis and Iron Mountain Railroad Company, established and incorporated by an act of the Legislature of the State of Missouri, approved March 3d, 1851, to have the right of way upon the bank of the Mississippi river, in front of the city of Columbus, in this Commonwealth, and along and over the streets of said city, for the purpose of extending their railroad from the bluff at the upper point of said city to the depot grounds and main track of the Mobile and Ohio Railroad, located within said city of Columbus: *Provided, however,* That before the right herein granted shall be exercised by the St. Louis and Iron Mountain Railroad Company, said company shall have first obtained the consent of the mayor and council of said city thereto.

SEC. 2. That in the enjoyment and exercise of the right granted in the first section of this act, the St. Louis and Iron Mountain Railroad Company shall be entitled to all the privileges, rights and immunities, and be subject to all such restrictions as are granted, made, and prescribed for the benefit, government, and direction of said company by the act of their incorporation aforesaid: *Provided, however,* That nothing in this act shall be construed to exempt the property of said company, within this Commonwealth, from such taxation as may be fixed and prescribed by the laws of Kentucky: *Provided, further,* Nothing herein shall be construed as preventing the issue and levy of attachments, and sustaining actions against said corporation as a foreign corporation, as provided by section 221, Civil Code.

SEC. 3. That this act shall take effect from and after its passage.

Approved January 18, 1871.

There was not a copy of the act referred to in the Capital of Kentucky when the above act was passed. We know this to be true; we heard it inquired for, and even the friends of the measure had never seen it. Yet it was adopted. But then the line did not run in imaginary competition with Louisville, or stand in the way of a *through line* via Maysville.

Now, it is well known that a certified copy of the Ohio law denominated the "Ferguson bill" was placed on file in the office of the Secretary of State of Kentucky, and printed copies of the same were circulated throughout the State of Kentucky *ad libitum*; yet it seems that the editor of the *Bulletin* has been singularly unfortunate in not being able to obtain a copy. We trust a copy may be forth-

with forwarded, so that he may be enlightened.

In the interim we will, however, remark that the principal power conferred on the Trustees is to borrow, *on the credit of the city of Cincinnati, Ten Millions of Dollars*, which they are authorized to spend in the construction of a railroad extending from the city of Cincinnati to Chattanooga, over a belt of territory entirely destitute of railroad facilities, and which for twenty miles on each side of it would be enhanced in value not less than one hundred per cent.

There would be not less than Five Millions of cash expended in the State of Kentucky in the work of construction, and thereby her farm products would be brought within the reach of markets both North and South, and her mineral resources developed. The farmers of Mason county, who have voted so liberally of their means to construct the Maysville and Lexington, and other roads, would get what they want—an extension of their lines to the far South, whereby they could ship without delay or loss the products of their exceedingly rich and beautiful country.

We had hoped that the delusions and promises that incited the opposition of our Mason county friends to the bill two winters ago, having been found to be fallacious, they would have lost their weight, and they would have been able to see their true interest. It should be apparent by this time, even to them that the great corporation that promised to construct their through line by the way of Maysville, would hardly be expected to destroy the property they hold in the Little Miami, as well as that which they have contracted for in the Kentucky Central, contingent only on the decision of the Court of Appeals of Kentucky, merely for the purpose of constituting the city of Maysville a *way station* on a through route, even though it should be a few miles shorter. They have too much already invested and contracted for to justify any such proceeding.

The material interests of Northeastern Kentucky are intimately bleuded with the Cincinnati Southern Railway, and the twaddle about the "principle involved" is all moonshine—nothing else. The opponents of the measure talk about the "principle involved," but we have never seen it stated what that principle was. The Kentucky Legislature voted to sell a railroad, in which the State itself is a stockholder, the other day, to a foreign corporation. What became of the "principle" on that occasion?

How much more foreign are five Trustees with limited financial power, or what more danger is there to the liberties and sovereign rights of the people, in their constructing and controlling a line of railway, than there is or may be on the part of a Board of Directors, with unlimited capital and corresponding powers of extension?

Scioto Valley Railroad.

ELECTION OF DIRECTORS.

The following very sensible remarks from the *Portsmouth Republican*, relative to local subscriptions to new railroads, are equally applicable to other localities. The truth is, if a neighborhood needs, but is unwilling to aid in procuring and constructing a railroad for its benefit, it ought, and generally succeeds in not getting one. What should be the burden of all, is unjust to impose on the shoulders of a few. Hence, if the aid necessary or due from one portion of a line is obtained, it is unjust in the other portion equally (or perhaps more deeply) interested to withhold its quota because the line can not become profitable unless constructed as a whole, and the parties already "in" can not "back out" and will therefore be forced to "put in" enough to complete it without the aid of the withholding community. All should "go in" on the "level" and "share and share alike." The *Republican* says:

A meeting of the stockholders of the Scioto Valley Railroad convened at Chillicothe on the 19th inst. The requisite amount of stock having been subscribed, an election of a board of directors was gone into, resulting in the selection of the following named gentlemen: George Davis and Thomas Dugan, of Scioto; James Emmett, of Pike; L. G. Delano and William C. Williams, of Ross; Edward Smith and William E. Bolin, of Pickaway. There was a good representation present from each of the counties through which the road passes.

This prompt and satisfactory action of the corporators of the above projected line is a matter of encouragement to the business men of our city. The next question, and one of vital importance, is to find whether or not the desired aid will be granted by those living along the route, when the company's plans have been fully matured.

In considering the questions of the advantages of railroads and of that local aid in their construction which has become almost universally an indispensable prerequisite, we are apt to reason that railroads should be built only where they will pay, and that voluntary capital only should be employed. In other words, that the construction of a given railroad line is a question for capitalists solely to consider, and that purely as a business investment. This position we conceive to be fallacious. No one will dispute that money ought not to be thrown away on a railroad enterprise that will not pay; but there are many ways in which a railroad is profitable. Railroads always enhance the value of property benefited, and they stimulate, direct and even create business. Here is an element of profit, then, which can be properly taken into consideration, as much as dividends upon stock.

Now, for this local benefit to property and business some one must pay; and why not those who are benefited? Capital will construct railroads as a means of investment if it is the most remunerative form of investment open, but not otherwise. But capital will not build railroads unless the people benefited co-operate in the construction, for the simple reason that capitalists can make better use of their money. The question, then, is practically reduced to this—that localities to be benefited must unite in the building of new

roads, or none will be built. Of course, before giving their means into the hands of any corporation, people must be convinced that prudent and honest management will prevail; but if satisfied on that point, why should they not be willing to pay a fair price for benefits to be derived, and bear an equitable proportion of the cost of the road.

The Best Winter Route East.

Say what you will about it, the best winter route from Cincinnati to the East is the broad gauge. We have recently tried them all, and find in this one speed and safety, comfort upon the trains and conveniences of the best sort at the most favorable places along the line, and time and connections promptly made. What more can any one have, what more does any one want in railroad accommodations? The traveler is hard to please who is not satisfied with this magnificent thoroughfare from the West to the East. If any of our citizens have occasion to go eastward this winter, let them try this line, and our word for it they will find it the best winter route to the East that we have.

Delaware & Hudson Canal Company.

It will be remembered that in the contest of the Albany & Susquehanna Railroad to maintain its independence as against the Erie dynasty, the property was finally leased to the Delaware & Hudson Canal Company, one of the most powerful cash corporations of this country, but whose energies had been mainly devoted to the development of its coal interests. For the purpose of extending its facilities of supplying eastern, central and northern New York with its own products, it has adopted the prevailing policy of absorbing connecting lines, and in doing so, we are glad to see that they have also adopted the policy of promoting their faithful servants. We copy from the *Troy Times* the following complimentary notice of the appointment of S. E. Mayo, Esq., all of which, of our own personal knowledge, we can more than endorse:

S. E. Mayo has been appointed general ticket agent of the railroads managed by the Delaware & Hudson Canal Company. Four years ago, when the Albany & Susquehanna was about being completed, Mr. Ramsey called Mr. Mayo from the Western Union Telegraph office in Albany to the position of general ticket agent and manager of the telegraph lines of that road. His performance has been a signal success. Faithful, efficient and intelligent in his work; prompt, courteous and obliging in his relations to the public, he has gained confidence and esteem constantly and upon all sides. Hence his promotion to a larger field.

—In regard to the Grand Rapids & Indiana Railroad land grant of 1,160,000 acres, the Hon. W. A. Howard, manager, reports total sales thus far at 50,000 acres, at an average of \$15 per acre; and he furthermore estimates the proceeds from the entire grant at \$10,000,000, net. He states that one section of 640 acres was sold by him a few days ago for \$20,000, and the timber alone on 400 acres for \$13,600.

Rockport, Fulton, Laredo & Mexican Pacific Railroad Company.

By a copy of the Rockport (Texas) *Transcript*, we learn that our old friend GEORGE W. FULTON, Esq., is at his old tricks again, building railroads. We had supposed that when he quit railroading in this climate, and went to care for his vast estates in Texas, that he would have let railroads alone, but he seems to turn to it as naturally as a young man to his sweetheart. The objects of the above named road are clearly stated in the charter. They are, "To establish, construct, complete, maintain and operate a first class railroad from and beginning at or near Rockport and Fulton on Aransas bay to Laredo on the Rio Grande or to some more convenient point upon said river with the ultimate view of connecting with a railroad within the Republic of Mexico from some point upon the gulf of California, and the company are hereby given, granted and endowed with all the general and special powers necessary to enable them to carry out and fully consummate said object, to purchase lands, accept donations or grants of land, or any other property."

The company was organized on the 7th instant, by the election of the following board of officers: G. W. Fulton, president; J. M. Doughty, vice president; J. M. Mathis, treasurer; J. H. Hynes, secretary.

We learn that the directors have under consideration the contract with Judge H. M. McWillie, and that the survey of the road will be commenced in about ten days. The gentlemen who have the matter in charge are determined that no useless time shall be spent in delays, but that the work shall be pushed forward as rapidly as possible.

Long Horns vs. Short Horns.

A RAILROAD INJUNCTION CASE.

D. W. Iddings, Esq., attorney for the Cincinnati & Springfield (Short Line) Railroad, on the 11th filed in the Court of Common Pleas, an injunction to restrain the C. H. & D. R. Co. from laying their track and occupying that portion of the railway of the Short Line Company lying between the tracks of the Dayton & Western and C. H. & D. roads, just west of the Miami river bridge. As stated in yesterday's *Journal*, the Short Line Company had graded their roadway for a distance of several hundred feet west of the bridge, on the grounds lying between the tracks of the C. H. & D. and the Little Miami or Dayton & Western roads, preparatory to connecting with the track of the latter across the bridge, and the C. H. & D. Company, on Saturday, took possession of this roadway of the Short Line, and commenced laying down a side track to be occupied for their own use. Application was made to enjoin them from continuing the work, and the injunction was allowed by the Court. The question of the right of the Short Line to occupy and use this strip of track will come up for adjudication hereafter in the Courts.—*Dayton Jour.*

Cincinnati Southern Railway.

Major General W. S. Rosecrans has written the following letter in reference to our proposed Southern Railway. Estimates of the cost of the Cincinnati road to Chattanooga may be figured from the statements made in the communication—the entire line being 333 miles by the shortest survey, and 340 by the longest. The following is the letter:

BURNET HOUSE,
CINCINNATI, December 25, 1871.

MY DEAR FRIENDS—The Denver and Rio Grande Railway runs south from Denver, Colorado, at the eastern foot of the Rocky Mountains, over rolling prairie and points of foot hills, and in the first fifty miles ascends two thousand three hundred feet, and descends about seventeen or eighteen hundred feet again before it reaches Colorado Springs, seventy six miles from Denver, to which distance it is now in operation.

As I rode on the pilot and engine most of the distance, and noticed the character of the work and cutting, filling and bridging, including rock cuttings, I must say to you that I can not think of any Ohio road that would average as much work per mile, on any section of 76 miles as this road.

From the general character of the topography, shown in the very complete surveys of your Cincinnati Southern road, I don't think that, excepting the large bridges, it need be much more expensive than the Denver and Rio Grande Railway so far.

As to the cost of this, I know that the 76 miles now in operation cost for construction and equipment less than one million of dollars. As to the amount of equipment, I can also state that it was sufficient to enable the road to earn \$6,100 for the week ending December 7th instant.

When these facts are considered, and that freights on iron and rolling stock for your road would be at least one and a half per cent. per pound less than for that road, engineers can calculate what your line would likely average per mile. If that road cost less than \$13,500 per mile under such circumstances, and thus equipped, what would yours cost, is a question which your surveyors and engineers can compute, remembering, as they must, that the three feet gauge is more pliable and can be made thus to save cutting, filling and tunneling unavoidable with the standard gauge.

In view of all this, I think your line ought not to cost more than twice that of the Denver and Rio Grande Railroad, to build and equip it adequate for the first year's work.

Yours truly,

W S ROSECRANS.
Hon. E A FERGUSON, Cincinnati, O.

To the Editor of the Commercial:

Mr. C. W. Woolley, in his communication to the *Commercial* of yesterday, states that Mr. Ferguson admitted to a mutual friend "that a decision of the Supreme Court affirming the constitutionality of his bill would include the legality of a bonus from the city to any one who would build the road for us." This is a mistake. It has never been held in Ohio that the legislative authority extended to raising money by taxation to be given away where the ownership was to be private, even for a public object, and I trust never will be. The recent decision sanctions no such principle, but just the contrary. All hope of a bonus from the city, either under the present or any amended Constitution, in my judgment,

may as well be given up. Whether the new Constitution will authorize taking stock, to a limited amount, in public works, is doubtful, and a matter of policy about which I have neither formed nor expressed an opinion.

E. A. FERGUSON.

—*Cincinnati Commercial.*

Cincinnati Southern Railway.

ROOMS BOARD OF TRADE,
CHATTANOOGA, Dec. 8, 1871.

To the General Assembly of the Commonwealth of Kentucky:

At a meeting of the Board of Trade of the city of Chattanooga, Tennessee, the following preamble and resolutions were unanimously adopted:

"WHEREAS, The Board of Trade of Chattanooga caused to be presented to the last General Assembly of Kentucky a series of resolutions respectfully pressing upon the consideration of that body the expediency of granting the charter sought by the Trustees of the Cincinnati Southern Railway; and whereas, it is understood that the application for said charter will be renewed before the present General Assembly; and whereas, this Board is profoundly impressed with the vast and diversified advantages which would accrue from the construction of said road, not only to this community but to the entire country traversed by it, as well in Kentucky as in Tennessee; therefore, be it

"Resolved, That, in our opinion, the proposal on the part of Cincinnati to build a railroad between that city and Chattanooga is entitled to the cordial co-operation of the counties and communities through which it is proposed to run said road; and should receive from the General Assembly of Kentucky the same favorable consideration which has already been accorded to it by the Legislature of Tennessee.

"Resolved, That the exigent needs and interests of the section of country along the proposed line of said road demand its speedy construction. No equal area of country upon the habitable globe is more prodigally supplied with mineral wealth, with agricultural resources, and with the conditions of mechanical and commercial prosperity. This wealth and these resources, now dormant and neglected, will spring into bounteous development upon the completion of this great thoroughfare of trade and travel.

"Resolved, That the proposed road will constitute the natural trunk connecting the railway system of the South with the network of Northern roads and the commerce of the Ohio river, and will supply to the States south of Tennessee and east of the Mississippi those facilities of direct communication with the North from which they are now, in large measure, precluded, and which their agricultural, manufacturing and commercial interests and necessities demand.

"Resolved, That a fellowship of interest in the vital benefits with which this enterprise is fraught will, it is hoped, relieve the action hereby taken by this Board from the appearance of an unbecoming or gratuitous suggestion to your intelligent and honorable body.

I CERTIFY that the above resolutions are a true copy, and that Hon. E. A. James, of our city, was duly appointed as a delegate to present them to the Legislature of the State of Kentucky, now in session.

W. P. RATHBURN, President.

Chesapeake & Ohio—Dayton Extension.

Col. Trimble and his friends are working with a most hearty good will, and no doubts are entertained of full success in raising the amount necessary to secure the completion of the road. Of the progress of their labors the *Highland News* says:

Subscriptions to the new railroad are progressing rather slowly in this county. About \$5,000 have been raised the past week, the sum total now amounting to about \$130,000—leaving \$45,000 still to be raised. Most of the committees appointed to canvass the country in the immediate vicinity of Hillsboro, are at work this week, and we hope to have a good report from them in our next issue.

In Brushcreek Tp. they are working well, and had over \$15,000 subscribed up to last Monday.

Marshall Tp. is lagging behind, not having raised half her quota of \$25,000. The friends of the road in that township must be up and doing. There is no time to be lost.

From Clinton county we have more encouraging reports. Wilmington is reported to have waked up and gone to work in earnest. We understand a number of her leading citizens are now ready to guarantee the whole quota of the county—\$150,000. At New Vienna the subscriptions amount to \$15,000.

A dispatch from Dayton to the Cincinnati Gazette of last Monday, says that the stock was being taken rapidly in that city.

Col. Trimble returned home last Friday evening, and left again on Monday morning to hold meetings in the Symmes creek valley. A meeting was held in Jackson on Monday of last week, which was well attended, and committees were appointed to canvass for stock.

The Pike County Republican of last week says it is informed that subscriptions were going on satisfactorily, and that their quota of \$50,000 was likely to be raised.

LOUISVILLE, KY., Dec. 22.—Samuel Gill, Superintendent of the Louisville, Cincinnati & Lexington Short Line, has resigned his position, to take effect Jan. 1st. J. E. Gimperling, Assistant Superintendent, will be Acting Superintendent, and probably soon will be appointed Superintendent of the road. Mr. Gimperling is one of the ablest and most popular railroad men in the State.—*Courier Jour.*

The name of Sam. Gill has become a household word among Kentucky railroads, and we can scarcely conceive of a separation of it from the name of the old Frankfort, Lexington & Louisville Railroad. Economy, safety and regularity, are the integral elements of his management, and the results to stockholders was everything that could be desired from a local line of traffic. We trust that relief from onerous duties and the quiet of private life will bring restored health, and prepare him for that enlarged field of usefulness to which his capacity so admirably adapts him.

The Babcock Extinguisher.

Telegraph to Robt. Harris, Gen'l Supt. C., B. & Q. R. R.

GALESBURG, ILL., April 29.—Quincy Car House caught fire last night. The cars in it would have burned entirely but for two Babcock Extinguishers.

Chesapeake & Ohio Railroad.

The annual meeting of the stockholders of the Chesapeake & Ohio Railroad Company was held in Richmond, Va., on the 7th inst. The President in his report states that the bonds of the company now command 94 cents on the dollar, and prophesied a premium within the year. The road is now completed from the city of Huntington, on the Ohio river, to the mouth of New river. That portion of the line between the mouth of New river and White Sulphur springs (102 miles), which will complete the line from the city of Richmond to the Ohio river, is all under contract, and the grading and masonry on eleven miles of it is completed, and the balance of the work is progressing so favorably as to leave no doubt that the whole of it will be completed, and that the cars will be running daily over the entire line from Richmond to the city of Huntington before the close of the present fiscal year.

The surveys which have been made during the past year established the fact that connections may be made at either of several points on the Chesapeake bay, having good harbors and abundant depth of water, and easily accessible from the ocean at all seasons of the year, at moderate cost.

The funded debt of the road secured by mortgage is \$11,237,100; and the amount of bonds issued for funded interest is \$163,844.95; dividend bonds, \$29,312; the floating debt, \$1,234,906 11.

The General Superintendent states that the earnings of the company from passengers, freight, &c., amount to \$769,265 05; expenses, \$479,256 62; net receipts, \$290,008 43. The increase for the year is \$91,939 78. There is also a decrease in the expenses of \$138,182 42.

The equipment consists of 37 locomotives, 15 first class and 6 second class passenger cars, 12 baggage, mail and express cars, 205 box cars, 55 stock cars, 124 flat cars, 20 gondola cars, 10 cahoose and boarding cars, and 7 gravel cars; 100 freight cars have been purchased, and 50 freight, 61 dump, 6 gravel, 3 passenger and 1 mail and express cars have been built at the company's shop.

Messrs. C. P. Huntington, A. A. Low, W. H. Aspinwall, of New York; Pliny Fisk, of Pennsylvania; David Stewart, Jonas B. Clark, Wm. B. Hatch, of New York; H. C. Parsons, of West Virginia; John Echois, Wms. C. Wickham and Jos. R. Anderson, of Virginia.

"Honor to whom Honor is due."

There was a high time among the railroad men last night. A number of the leading officers and representatives of railroad interests at this point assembled in the parlor of Walker's Exchange, and proceeded to present Mr. C. P. Atmore, general passenger agent of the Great Jackson Route, with a splendid gold watch and chain. The watch was inscribed: "C. P. Atmore, Gen. Pass. Ag't, from the Officers, Employees and Patrons of the J., M. & I. Railroad." The speeches on the occasion were eloquent and appropriate—and so were the wine and cigars. Mr. Atmore was completely taken by surprise, but soon so far recovered his presence of mind as to make a feeling and suitable response to the handsome compliment.—*Courier-Journal.*

Well that served Charlie "just right." "We are glad of it," and only regret that we were "not there" to "join in." May he never get a "worse lick," nor "his shadow ever become less."

Journal of Railroad Law.

Railroad Companies—What is Negligence on the part of fellow servants—Rule as to selection of servants and responsibility therefor by companies.

The facts in the recent case of *Brickner, Administratrix, &c., vs. The New York Central Railroad Company* (2 Lansing, 506), are fully and clearly stated in the following opinion by

POTTER, J.—A review of this case requires the statement of the leading facts proved on the trial. The plaintiff's intestate, Frederick Brickner, was a carpenter in the employ of the defendant at West Albany at the time of the accident which resulted in his death, and which occurred in October, 1867. Brickner was at the time, and for some days previous, with three others, had been engaged in putting skylights into the roof of the shop of the defendant; and to effect this object had built scaffolding below the roof under the openings for the skylights at a height of some twenty five feet above the floor or ground of the shop. Three such skylights were to be constructed; and to do this holes had to be cut through the roof of the size of the skylight. The carpenters had to stand upon the scaffold while at work, and while raising up the timbers when raised upon the scaffolds. The first two of these scaffolds were constructed by three carpenters, of which Brickner was one. These two scaffolds answered all the purposes of their construction. The third scaffold, which was built for the like purpose of being used for the carpenters to stand upon while constructing the third skylight, was built by two young men of the ages of sixteen and eighteen who were in the employ of the defendant, and who had little (if any) knowledge of the trade, one of whom had worked at the business but about two months.

When the three carpenters had finished the second skylight, they were ordered by the defendant's foreman or boss carpenter, whose name was Westman, to go to work upon the third. The carpenters found the third scaffold constructed. They proceeded from the second skylight over the roof of the building, and stepped down upon the scaffold from the third skylight through the hole cut in the roof for the skylight, this being the only way to get upon the scaffold. Seen from above, this scaffold was, in its appearance, like the others which had been constructed by the carpenters; it was closely covered with boards cut out of the roof. Three of the carpenters got on this scaffold, and when the fourth, who was the plaintiff's intestate, stepped upon the scaffold, it gave way; he fell to the ground, receiving injuries which resulted in his death. The timber with which this scaffold was constructed was insufficient in size, strength or quality for a scaffold; and one of the sticks upon which boards were placed was cross-grained hemlock. There is the absence of evidence in the case that either of the directors of the defendant had any personal supervision, or gave directions in regard to any of the work at West Albany.

The directing power there, so far as the proof shows it, is that one Colby was master mechanic, under one Jones, and that one Westman was boss of the gang of carpenters. That Jones and Colby were competent men, but there was proof that Westman indulged in habits of drinking, and was occasionally intoxicated; that Colby had threatened to dismiss him for that reason; and some proof

was given that he was intoxicated at the time he ordered the carpenters upon the defective scaffold. The carpenters who entered upon it did not know. They were sent to work upon it by Westman, who was the immediate boss of the gang of carpenters, and directed their work.

Upon this statement the first question, in fact the only question, as it seems to me, is, was there any fact in the case to be submitted to the jury? This is a question of law. The institutions of railroads in this country, as the great medium of individual and commercial transition, has introduced into our jurisprudence new subjects of discussion in and adjudications by the courts, as to the degree of care, caution and diligence, demanded respectively of master and servant, employer and employee, toward the other, as well as the degree of misconduct or negligence which creates liability upon the one, or which estops the other from the making a claim for damages for injuries received while engaged in the employment of such other. To a certain extent, in given cases, we may regard the law as settled by our highest courts; but the ever varying cases, in fact and feature, presented to the courts at *nisi prius*, calls upon that court, and the court of review, in the examination of a case thus changed in its presentation from every other, to apply to it, first, what is the settled law of the general and particular cases. And to that portion which appears to be novel, or a variation from settled adjudications, to apply such general principles of common law as seem to be demanded by it.

In this case we may perhaps assume, as a settled general rule, "that a master is not responsible to those in his employ for injuries resulting from the negligence, carelessness or misconduct of a fellow servant engaged in the same general business." As also, "the rule exempting the master is the same, although the grades of the servant or employees are different, and the person injured is inferior in rank, and may be subject to the directions and general control of him by whose act the injury is caused."

In the case of *Gilman vs. The Eastern Railroad Corporation* (10 Allen, 233, 239), an employee of the defendant brought his action for an injury occasioned by the negligence of a switchman in failing properly to adjust the switch upon the track. The court held that the plaintiff, being a fellow servant in the employ of the same railroad company, could not have recovered of their common master; but they add: "The evidence offered by the plaintiff at the trial was competent to show that the defendant knowingly, or in ignorance caused by their own negligence, employed an habitual drunkard as switchman, and thereby occasioned the accident. Of the sufficiency of their evidence a jury must judge. If the plaintiff can satisfy them that such misconduct or negligence in the defendant caused the injury, and that he himself used due care, he may maintain his action." In the same case they say: "It is well settled, both in England and America, that a master is bound to use ordinary care in providing his structures and engines, and in selecting his servants, and is liable to any of his fellow servants for his negligence in this regard."

If the case we are reviewing depended upon the question whether a fellow servant could maintain an action against the common master for the negligence, carelessness or misconduct of a fellow servant engaged in the same general business, it would be clear that the learned judge correctly ordered a non suit at the trial. The case, however, has evidence in it tending to sustain a different basis of right

to recover, to wit: The negligence of the defendant in erecting an unsafe and dangerous structure upon which the plaintiff was placed or directed to go, to perform his labor; and the negligence of the defendant in selecting proper and competent servants, or knowingly keeping intemperate and incompetent servants in their employ, by reason of which the plaintiff's intestate was injured. Upon this feature of the case we think the learned judge was in error in not submitting the case to the jury with proper instructions as to the law of the case, or with proper issues of fact to be found by them, upon which the law could be declared. There was evidence in this case of the incompetency of the persons who constructed the scaffold in question; the fall of which caused the death of plaintiff's intestate. They were mere boys, sixteen and eighteen years of age, unlearned in the trade of carpenters, and as a natural consequence, inexperienced and unacquainted with the strength and support necessary for such a structure. In the absence of proof as to who directed them to construct the scaffold, the presumption must be that it was the defendant, or the directing power of the defendant; some one who had the authority to direct. If the presumption should be that it was Westman, the boss carpenter, then the direction was given by one as to whose competency, by reason of his habits of intemperance, was a question of fact properly for a jury. It is entirely clear that the scaffold, as a structure, implement, facility, or appliance, by whatever name it may be called, was an unsafe and dangerous one; it was constructed by incompetent persons, and of poor and insufficient materials. When this was proved, I think the burden was upon the defendants of showing, at least, that it was constructed by a competent director of work, or competent fellow servant. If the defendant, as master, directed these incompetent boys to construct this scaffold, then they are responsible for the consequence.

Perhaps we have gone as far as necessary to show it was error in the judge to take this cause from the jury. I do not understand it to be urged as a ground for sustaining the non-suit, that the plaintiff's intestate had been guilty of contributing negligence on his part; or that the learned judge put his decision on that ground. Upon the argument of this case the main point relied upon to sustain the ruling of the learned judge was, that no negligence was brought home to the defendant. That the business of employing and discharging men was left to Colby and Jones; and they being competent, whatever resulted from their negligence, is to be accounted the negligence of a fellow servant.

Though the case does not inform us who employed either Jones, Colby or Westman, as agents or operatives, it does appear that among themselves they took some rank in the order of Jones, Colby and Westman. They were all called bosses by the workmen, which is doubtless a title of superiority, perhaps each in a different department. Jones was highest; but Colby employed and discharged men; and Westman was in charge of and directed the gang of carpenters as to their work. As none but the principal has the right to employ agents and servants, without a delegation of the power to do so, the presumption must be in this case, in the absence of other evidence, that these three bosses were employed by the defendant, and each had delegated to him power to direct.

It is claimed that in cases of corporations, who can only act by agents, that the directors may be regarded as the master, or principals, and that all others, all persons in their em-

ploy, whatever may be their employment or duties, whether general superintendent, or the lowest grade of menial laborers, all stand upon an equality of co-laborers, or employees, as regards the question of negligence toward each other. This may be the rule where the executive power, the directing and superintending duties of the corporation are performed by the directors in person, as was the case of *Warren vs. Erie Railway Company* (39 New York, 471). I have not yet learned from any respectable adjudications, that a railroad, or other corporation, by appointing a superintending agent to transact all executive duties, and surrendering to him all right to perform such duties, retaining and exercising no power to discharge such duties themselves, can escape all legal liability as master; that the superintending and controlling agent in such case can be held to be only a mere fellow servant and co-laborer, the equal with all other employees of the corporation; or, in other words, that by this device, corporations can avoid having a master to whom negligence or knowledge of defective or insufficient machinery, implements or appliances, can be brought home, so as to create liabilities. Such a doctrine is simply monstrous. Corporations would thus be absolved from all possible liability, and the sound old maxim *Qui facit per alium facit per se*, would be abrogated.

A corporation can not act personally. It requires some person to superintend structures, to purchase and control the running of cars, to employ and discharge men, and provide all needful appliances. This can only be done by agents; they are the representatives of the corporation. They are then the executive head or master. Their acts are the acts of the corporation. The duties above described are the duties of the corporation. When these directors appoint some person other than themselves to superintend and perform all these executive duties for them, then such appointees, equally with themselves, represent the corporation as master, in all those respects. And though in the performance of these executive duties he may be and is a servant of the corporation, he is not in those respects a co servant, a co-laborer, a co-employee, in the common acceptance of those terms, any more than is a director who exercises the same authority. Though such superintendent may also labor like other co-laborers, and he may be in that respect a co-laborer, and his negligence as such co-laborer, when acting only as a laborer, may be likened to that of any other, yet, when by appointment of the master, he exercises the executive duties of master, as in the employment of servants, in the selection or the adoption of the machinery, apparatus, tools, structures, appliances and means suitable and proper for the use of other and subordinate servants, then his acts are executive acts; are the acts of a master; and then the corporation are responsible that he shall act with a reasonable degree of care for the safety, security and life of the other persons in their employ. These executive duties may also be distributed to different heads of different departments, so that each superintendent within his sphere may represent the corporation as master. In controlling and directing structures, in employing and discharging operatives, in selecting machinery and tools, thus he speaks the language of a master. Then he issues their order to their operatives. Then he is the mouthpiece and interpreter of their will. Their voice which is silent, is spoken by him. He then only speaks their executive will, not the irresponsible will of a fellow workman or co-laborer. The corporation can speak or act in no other way.

His executive acts are their acts. His negligence is their negligence. His control, their control. He has in the executive duty no equal. He is not while in the performance of these executive duties, only the equal of the common co-laborer or co servant. I do not discover in this view anything in conflict with the case of *Wright vs. New York Central Railroad Company*, or *Warner vs. The Erie Railroad Company*. Those cases have not held, that when a corporation exercises its executive power by an agent or superintendent, that they are not liable for his negligence as such, because he is only a servant of the corporation. That step in advance is yet to be taken by the courts in this country. Before it is taken, I think the court will take into consideration the consequence of such a rule. I doubt if they will be found inclined to open a door which should allow corporations or individuals to escape all responsibility for accidents occasioned by negligence of their executive agents, and thus suggest the expediency of managing all institutions in that way.

We are referred by the brief of the defendant's counsel, to two cases recently decided in the English courts (*Gallagher vs. Piper*, 16 C. B. N. S. 669, and *Wilson vs. Murray*, decided in the House of Lords in 1868) which it is said, held the rule that knowledge of negligence must be brought home to the defendants; and that it is not sufficient that knowledge of such negligence be brought to the defendants general manager, the foreman of the scaffold in the case of an insufficient scaffold. I have not had access to the books containing those holdings, and the statement from the brief does not show us whether the master or defendants in those cases, themselves, had personal charge of their own business, or whether the whole charge of the management was committed by the master to a superintendent and general manager. That is the distinction that I have regarded as important, if not controlling, and have not felt bound in this court to adopt the rule as it is claimed. I do not think it could be endured in this country. But the negligence referred to in the English case of *Wilson vs. Murray* was the negligence of a competent and skillful workman, not the negligence which consists in the employing an incompetent and skillful one, through whose incompetence the injury happened. A very clear difference.

This case shows an absence of all evidence as to the actual power of those persons who exercised executive duties. The apparent authority, in such case, must be presumed to be the real authority. There were facts in the case that should have been presented to the jury. It was error to nonsuit.

Judgment reversed.—*Am. R. R. Jour.*

ALABAMA & CHATTANOOGA RAILROAD—We have noticed for several days past, at the Alabama & Chattanooga Railroad depot, quite a number of cars from the New Orleans and Texas railroads, loaded with through freight for this point. It is not generally appreciated, but it is a fact, that the demand for rolling stock to do the through business between this point, Mobile and New Orleans, is much greater than the ability of the present management of the road has or will be able to supply, even with the courtesies usually extended by connecting roads. This shows that we have not heretofore over estimated the importance of the Alabama & Chattanooga Railroad as a link in the through line connecting us with the markets indicated. With the facilities it should have, this road can not fail to do a heavy and lucrative business.—*Chattanooga Times.*

Indiana Block Coal for Manufacturers.

Gen. Alfred Pleasanton, President Cincinnati & Terre Haute Railway:

DEAR SIR—You ask, "Why is block coal superior to other coals for making iron?" In reply, I would say that the block coal of Indiana differs in its action on iron, both in the puddling furnace and blast furnace, from all other free burning coals with which I am acquainted. This may, in a measure, be due to its physical structure, but mainly, in my opinion, to its containing relatively more hydrogen than oxygen, and a large amount of carbon as mineral charcoal.

In the puddling furnace a less quantity is required to make a ton of iron, the heats are brought off in a shorter space of time, and the quality of the iron is better than that made from the same stock with other coals. Iron made here at the Capital Rolling Mill, with this coal, is sold in Pittsburg for the manufacture of gun barrels. Mr Sims, an experienced rolling mill manager, of the latter city, assured me that he had never used a coal which gave such complete satisfaction in the puddling furnace as the *Indiana block coal*.

Mr. Roberts, superintendent of the Union Rolling Mill, of Chicago, says he has worked in rolling mills in England, Troy, New York, and Cleveland, Ohio, and that he has met with no coal equal to the Indiana block coal for making rails.

In the blast furnace it holds up a large burden, produces an immense heat, and does not scaffold or hang, but glides smoothly down the walls of the shaft without scarring, and makes a soft, gray, highly crystallized pig iron, when the hematite ores of Missouri and Lake Superior are used, which is in every respect equal to the charcoal iron made from the same ores, and just the quality required for making steel.

In the western part of Owen county and in the eastern part of Clay county, the proposed railroad from Cincinnati to Terre Haute will pass over a basin of as good coal as can be found in the State. The seams range from three and a half to five and a half feet in thickness; indeed, I found the seams thicker here than in any other part of the basin. * *

The uncertainty of river transportation, as a means of obtaining fuel, has been so fully demonstrated to the citizens of Cincinnati and Louisville this season, that I should think they would, at once, take an active part in providing the necessary means to insure the building of a road that will at all times make them secure against a coal famine, keep their manufacturers supplied with the best of fuel at regular rates, and bringing to their doors a commerce that at present finds other markets.

In a former letter I referred to the good character of the block coal pig metal for making Bessemer steel. This branch of manufacture is destined to revolutionize the iron business of this country, as a Bessemer steel rail will last seventeen times as long as an iron rail. I think I may safely say that all the railroads running through this State are paying a handsome dividend, and are in a good condition to replace their iron rails with steel ones. That it is their interest to do so can be clearly shown; hence all that is wanted is the facility of procuring them.

Yours truly,

S. F. Cox,
State Geologist of Indiana

—*Cin. Com.*

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No. 167 Walnut Street, Cincinnati, Ohio.

The Railroad Record.

E. D. MANSFIELD, - - - - - } Editors
T. WRIGHTSON, - - - - - }
A. J. HODDER, - - - - - }

CINCINNATI, THURSDAY, JANUARY 4, 1871.

The Railroad Record,

PUBLISHED EVERY THURSDAY MORNING,

By Wrightson & Co.,

OFFICE—No. 167 Walnut Street

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My Journey—The Railroads of the South— Their Peculiarities.

On the night of the 20th—one of the coldest nights of this cold season—we left the Covington Short Line depot to find, if we could, the “Sunny South,” which as at present advised, seems a myth. The readers of the RECORD may be interested in hearing how railroad traveling in the South seems to me, who have been so long familiar with it in the North. Let the reader, then, accompany me, step by step, and he will get an idea of the differences between the railroads of the South and those in Ohio.

To begin at the beginning, the Short Line depot at Covington is utterly unworthy of the road, for the road is a good one. The depot must be new, and yet the room into which the ladies were ushered was inferior to anything you can find in Ohio; a dirty room, with pine benches, and no appearance of care for anything. We could keep warm, and in so cold a night that was a good deal. Well, we are off, and the road seems in good order and carefully managed, but we are led to one conclusion on all the roads from Covington to Augusta, either that they were not in good order, or that they were too carefully run. I presume the former is the fact, or there would be no reason for such slow rates. Nominally (and in not severe weather truly) we leave Covington at 6.40 P. M. and arrive at Louisville at 11.45 P. M., which is 5 hours and 40 minutes, and as the distance is 107 miles, it is less than 20 miles an hour. At Louisville,

the transfer to the Nashville train is execrable. We arrive at some sort of a depot, get into another car (which turns out to be only a transfer car), are run round the town a considerable distance, and then get into the Nashville cars. Now it seems to me, Louisville ought either to say that she will not allow passengers to be transferred through that town, or allow it to be done in a decent and comfortable way.

But, we are off for Nashville. The snow deepened, and the cold was colder, as we passed through Kentucky. About 9 A. M. of Thursday, we passed the bridge over the Cumberland and entered the city of Nashville, where we were fortunate enough to find the Chattanooga cars waiting for us. Now, without setting down aught in malice, I say the Louisville & Nashville Railroad is *not* what it ought to be, compared with any of the great northern lines, it is decidedly inferior. Its running is 23 miles an hour, which is more than that of the Short Line road. At 292 miles from Cincinnati we have taken 14 hours, which is 21 miles an hour.

The cars on the Louisville & Nashville road are about on an average, but the one we were in very dirty. Happily, however, we are now to leave Nashville on a road and cars which are first rate. Tennessee is the most enterprising and the most enlightened of the States south of the Ohio. I shall not stop to prove that, but those acquainted with the Southwest will, I think, admit this. At any rate, the Nashville & Chattanooga Railroad is a first class institution. The car we were in, an ordinary passenger car, was one of the very best I ever saw. It was made in Nashville, in the car shops of the Nashville & Chattanooga Railroad Company. If they can do such work as that in Nashville, the Northern manufacturers best look out for their laurels. No better work can be found anywhere. The road also seemed to be good, but for some reason the rate of going was slow. The distance to Chattanooga is 151 miles, and the time table gives 9 hours. This you see is but 17 miles an hour. Here we are then at Chattanooga, 443 miles from Cincinnati, in 23 hours, which is an average of 19 miles an hour, just two-thirds of the rate of the Northern roads. Now, let us notice something of the bearings of these facts on the Southern road question. We have lost on this route 150 miles in distance, and one-third the time in running it. What is the result? We take 23 hours to do what ought to be, and easily could be, in 10 hours! Do you think that makes no difference in the trade of Cincinnati? The truth is, this fact is alike disastrous and disgraceful to Cincinnati. For a little effort among the commercial and moneyed men would years ago have carried the Kentucky Central on to the Tennessee. I expect to furnish you with many facts on this head before my visit here is finished.

But we must hurry on. We have just rolled through the splendid scenery of the mountains and passes of the Tennessee; and now the sun is set; and we are rolling on to Atlanta. The roads and cars are on an average, but the slowness still remains; 138 miles in 8 hours is 17 miles per hour; but we get there safely and well; and that is much to be thankful for. At Atlanta we stopped 5 hours. It is well enough to stop, go to the hotel, and rest; but why? I could not find out, except that there were two continued lines, one to Macon, and one to Augusta, and they chose to connect with the Macon line, and not with the Augusta. Why should they not connect with both? Well, let us go. At 7 A. M. we leave on the old, and as they think great, Georgia State road, from Atlanta to Augusta and Savannah. We arrived at Augusta, 171 miles, in 10 hours. Here we have again the Southern rate, 17 miles an hour. Here at Augusta we are 752 miles from Cincinnati, on the great through route to the South, which we have made, without any gap in the connection, in 48 hours, *less than sixteen miles an hour*. Now, if you consider that the Pennsylvania road goes just about the same distance from Cincinnati to New York in 26 hours, you will see a great difference between Northern and Southern roads. You will also see at once, that if this was changed, and a passenger train went through from Cincinnati to Augusta say in 30 hours, it would make a great difference in the commercial intercourse and the business between Cincinnati and the South. But let us look at it in regard to the Southern road. How far is it to the center of that Southern country which Cincinnati wishes to reach? It is 752 miles to Augusta, and 890 to Charleston, on the best and in fact only route, and on an average it is 820 miles by the present railroad route to the heart of the Southern country. Now, if you will take your map, my reader, you will find, that after allowing for curvatures and loss of distance on railroad routes, that 600 miles is all that is necessary to make a solid railroad to the heart of the South. Well, now, run that road at 30 miles an hour, and you reach the heart of the Southern country in 20 hours. To Augusta you would go in 18 hours, and to Charleston in 24 hours; and freight trains would go in about double that time. What would be the result? Such time on such a road would be far in advance of anything from Chicago, St. Louis, or even Louisville. Cincinnati would have the whole command of the Southern trade, in the products of agriculture and of manufactures. To within 20 miles of the coast, even New York and Philadelphia could not compete with Cincinnati. In fact, Cincinnati has, for want of energy and enterprise, lost what in the 20 years past would have made her far in advance of Chicago, St. Louis, or any other place. She might have had 400,000 inhabitants to-day, and may have

half a million in a few years, if she will only understand and act upon her own interests.

I hope, within a few weeks, to give the RECORD many facts bearing upon these questions, and I really hope that Cincinnati may wake up to her own interests. E. D. M.

AIKEN, S. C., Dec. 25, 1871.

THE ALBANY LAW JOURNAL, is one of the neatest and most valued of our exchanges. Published at the capital of the State of New York, with every facility to acquire and disperse the accumulated riches of "legal lore," well known by the profession to exist and to emanate from that great legal center, the editors of the *Journal* have not failed in appreciating the situation, and with marked ability and tact, present weekly, in an attractive form and style, such an epitome as can not fail to be of advantage to the practitioner, as well as interesting to the general reader. It is just entering upon its fifth volume. Weed, Parsons & Co., are the publishers.

We have on several successive occasions received VICK'S FLORAL GUIDE, but the one just received for 1872 is the most complete and perfect of its class of publications that we have ever seen. It costs but ten cents, and is worth a dollar for the children to play with, let alone its intrinsic value to every lover of flowers. Send to James Vick, of Rochester, N. Y., for a copy.

Cincinnati Southern Railway.

AIKEN, S. C., Dec. 27, 1871.

HON. T. WRIGHTSON,

If you want a demonstration of the need of a "Southern road," come here. Flour is nearly double what it is in Cincinnati; and the distance by rail near 300 miles farther than it should be.

Yours truly, E. D. M.

The Babcock Extinguisher.

Headquarters Fire Dept. City of New York.
Office of Chief Engineer,
127 and 129 Mercer St.
New York, November 10, 1871.

F. W. FARWELL, Esq., Secretary.

Dear Sir—You ask my opinion of the Babcock Fire Extinguisher. It needs no word of praise from me. It has demonstrated its value.

The machines are in use in this Department, and many fires have been put out with them, and large damage by water prevented. They are, beyond a doubt, the best apparatus ever invented for self-protection, and if they were in general use, many millions annually would be saved from destruction by fire. I fully believe in them, and commend them to the public confidence.

Very respectfully,

JOSEPH L. PERLEY,

Chief Engineer.

The Coal Lands on the Kanawha.

CHARLESTON, W. VA., December 20, 1871.

To the Editor of the Commercial:

A correspondent in your paper of the 15th inst., places the value of coal lands in the Kanawha at one hundred dollars per acre. This is a serious error. I do not think an instance could be found where Kanawha coal lands have sold for that sum. The highest price that this writer has ever known to be paid was forty-two dollars per acre. A large average price would be twenty-five dollars per acre. The area of the Kanawha coal fields is larger than the entire coal fields of Great Britain. It is drained by the Kanawha, Elk, Big Coal, Little Coal and Guyaudotte rivers. In this coal field exists the bituminous, splint, cannel, semi-cannel and peacock coals, and many varieties of each. All of the rivers are navigable at flood tide for coal barges.

These lands vary in price from forty-two dollars an acre to one dollar and twenty-five cents per acre. As a general thing the price is regulated by the contiguity of the land to the Kanawha river. Some Pennsylvania parties have purchased one hundred thousand acres of coal lands on Elk river, containing seams of coal eight feet thick, at one dollar and fifty cents per acre.

The Chesapeake and Ohio road propose to carry coal from the Kanawha region to Huntington, it being all down grade except a slight elevation at Scary summit, at one cent per ton per mile. Coal can be shipped from Huntington to Cincinnati very often, when the upper Ohio is blockaded with ice or obstructed by low water.

The managers of the Chesapeake and Ohio road are anxious that other coal companies shall be organized on the south side of the Kanawha, there being now only one (the Kanawha and Ohio Coal Company) in order that full employment may be given to their coal trains.

If a few thousand dollars were spent in improving the navigation of the Kanawha river, immense quantities of coal would be shipped annually to Cincinnati by barges.

We have long been tributary to Cincinnati. We eat your hams, read your newspapers, and drink your whisky. You need our coal; we need a little of your surplus capital. A judicious exchange of these two valuable commodities would add greatly to our mutual advantage, and entirely do away with all fear of coal famines, and greatly increase the valuable trade which Cincinnati now enjoys and has long possessed in this region. CARBON.

(From the Kanawha Daily, December 25.)

PROFITABLE STOCK.

At this time the very best coal lands on the Kanawha, Elk and Coal rivers can be purchased at prices ranging from five dollars to twenty dollars per acre. Lock and dam the Kanawha river, and these coal lands will be worth, at once, one hundred dollars per acre.

Let the Kanawha river charter be organized with a capital stock of four million dollars. Two millions of this sum to be expended in erecting locks and dams, and two millions in purchasing coal lands. Say one hundred thousand acres at an average of fifteen dollars per acre, and fifty thousand acres at an average of ten dollars per acre.

Improve the navigation of the Kanawha by an expenditure of two million dollars, from Loup creek to the Ohio river (distance ninety miles), and it will make these one hundred and fifty thousand acres of coal land worth

one hundred dollars per acre, that is, fifteen million dollars.

All this can be done within two years, and thereby Cincinnati can be supplied with superior coal at low figures during all seasons of the year. And the stockholders of the Kanawha Coal and Navigation Company will find their investment most profitable.

ATLANTIC & GREAT WESTERN RAILROAD.

The new management of the road, the *Meadville Journal* says, instead of discriminating against local interests, have adopted the most liberal policy of stimulating way trade and travel by granting liberal concessions to this class of patronage. Orders have been issued providing for four classes of tickets to be issued upon application, as follows: 1. Round trip tickets—for single passage, saving five, ten, fifteen cents per trip over regular fare. 2. Commutation tickets—by which passengers secure a discount of twenty-five per cent. from regular rates. These tickets will be furnished for passages between any stations on the main line or branches. 381,000 mile tickets for \$20, good for passage on main line or branches, and more especially intended for the benefit of commercial travelers and shippers. Excursion tickets: These are designed for the accommodation of parties of twenty-five or more persons, are issued for the round trip at the rate of 1½ full fare one way. The object of these concessions is to encourage local business along the line, the managers wishing to afford every convenience and liberality which the traveling public and their patrons can reasonably desire.

—Western railway earnings for November, says the New York *Bulletin*, are very satisfactory, especially considering that during the latter part of the month traffic was in many cases interfered with by the severity of the weather. The Milwaukee and St. Paul road has suffered from this cause, the earnings being \$146,389 less than for November last year. The Illinois Central also shows decline, but with these exceptions there is gratifying increase. Central Pacific continues to show a large gain, the increase for November being \$121,349. The total earnings for the first eleven months amount to \$8,796,341, an excess of \$1,384,916 over last year. These figures indicate that the receipts of the road for the whole year will nearly reach \$10,000,000, the amount predicted some months ago by the friends of the company. In the Union Pacific, also, there is a healthy gain, the earnings being \$723,000, against \$570,000 last year; considering that the net earnings are much larger, in proportion to the gross, than last year, this must be regarded as a very handsome month's business. Lake Shore shows an increase of about \$78,000, and Michigan Central of \$80,000. The total November earnings of fourteen roads—which, with one or two exceptions are the only companies represented on the Stock Exchange that regularly report their earnings—amount to \$7,062,681 against 6,666,212 last year.

—An engineer, named Ford, has just recovered \$6,833 from the Fitchburg Railroad, of Massachusetts. His engine exploded in April, 1870, just after starting from the Fitchburg Station, severely injuring him. The case has been tried three times. The damages awarded the first time were \$4,000, and the second time \$5,376. Both these judgments were set aside as excessive, and the third trial was ordered, which has resulted as above.

New York Central and Hudson River R. R.

By a dispatch from New York we learn that the completion of the Grand Central depot and the facilities it affords, has enabled Vice-President Wm H. Vanderbilt to perfect the organization implied by the consolidation of the Hudson River and New York Central Railroads. Mr. Vanderbilt now becomes the head of the consolidated companies, and hereafter the directing influence will be fixed in New York city. Mr. Edwin D. Worcester, Treasurer of the late Central Railroad, resigns that position and accepts the office of Secretary of the consolidated companies, vice Augustus Schell resigned. By this arrangement Charles C. Clarke, for many years Treasurer of the Hudson River Railroad, becomes Treasurer of the consolidated companies. Mr. Drullard continues the General Freight Agent and will remain in this city, as will also Mr. Utter, Comptroller of real estate, rents and taxes. Auxiliary to the New York management, ex Senator Henry R. Pierson has been invested with the duty of Managing Director at this city. For the present Mr. Tillinghast is charged with the responsible duties of General Superintendent of the division west of this city, while Mr. Toucey has entire charge of the Grand Central depot at New York, its connections and line east of this city, incidentally of the two bridges spanning the Hudson river here. C. H. Fisher is designated as Chief Engineer. The promotion of Mr. Worcester will be exceedingly gratifying to the numerous Albany friends of that gentleman, while the continuance of Mr. Pierson in his responsible position is a deserved compliment to a worthy and capable officer. Mr. Tillinghast's retention as Superintendent of the Central division is to be expected as a matter of course. The General Office of the Company will still remain in this city, with which the interests of the road have been so long identified. It has always been fortunate in the selection of its officers, but never more so than now.—*Albany Journal*.

—The Cleveland *Plaindealer* says: "The enormous increase of railway freights is one of the marvels of recent business development in the United States. Notwithstanding the increase of railroads in all the States, there is not now one of the leading lines which is not fairly blocked with freight. It may be, moreover, broadly stated that not one of the great east and west roads possesses to-day tracks and machinery to do properly the business that crowds upon it. The Pennsylvania Central the Lake Shore, the Erie and the Atlantic, and the Baltimore & Ohio, are all in the market this fall as heavy purchasers of new engines and cars, one of these lines having in process of construction one hundred and twenty new engines, and another two thousand five hundred cars of a single class. Car and locomotive builders are surfeited with orders covering all the work that they can possibly turn out for months to come. Not less notable is the enlargement of the capacity of the roads themselves. Lines that for years have struggled along with single tracks now yield to the pressure of growing trade and are laying with all possible despatch a second line of rails. The double track of the Lake Shore road throughout its whole length is an example of this. The Pennsylvania Central is rebuilding entirely its eastern division, straightening the last thirty-five miles so much as to save seven miles in that distance."

The Detroit River Tunnel.

Progress is quietly making, as we learn from the *Detroit Post*, on the preliminary portions of this great undertaking. The *locale* of operations is the water front adjoining the Great Western Ferry slip. A coffer dam 40 feet square has been constructed (the water being 50 feet deep) and filled with clay, forming a solid pier through which the shaft is to be sunk over 50 feet. This latter weighs 8 tons, and is 15 feet in diameter. The brick work laid on the shaft has been built to a height of 10 feet; but the weight is not yet sufficient to sink the shaft perceptibly. The bottom being reached, work will begin on the drainage tunnel, the entrance to which will be 25 feet below that of the main tunnel, and rising to a point slightly below at the middle of the stream. It is considered that the hard blue clay will be the best material for the wall of the tunnel; and to secure this, it has become necessary, as the result of the surveys, to vary the course of the tunnel from a straight line—whereby, also, the maximum grade will be reduced to 1 foot in 50. The following sketch is given of anticipated difficulties:

The two sections of men at work under Lake Michigan (in the lake tunnel at Chicago), came out within an inch or less of the place calculated. That undertaking was, however, easy compared with this. It is necessary to construct two tunnels for trains both ways. There is a possibility of getting into strata in which there is quicksand. Then, as the upper part of the tunnel is to be within 12 feet of the river bed, there will of course be an enormous pressure. Arrangements must be made for carrying off the foul air, which so rapidly accumulates; and constant precautions used to prevent explosions. Massive frame works to support the earth until the masonry is built up must be made, and care taken lest before this is accomplished there be a sudden caving in of the earth. These and other contingencies must be provided for, and the magnitude of the work and difficulties in the way can hardly be sufficiently appreciated. The most skillful workmen that can be found will have charge of the various sections into which the work may be divided; men skilled in mining, and well versed in the "underground science."

The well known skill of Mr. Chesebrough gives confidence in the success of the undertaking. The other engineers are Mr. E. S. Chesebrough and Mr. E. C. Clark, under whose direct charge will come the details of the work, both men of ability and experience.

THE PENN. CENTRAL IN THE SOUTH.—The directors of the Georgia, and the representatives of the Central, railroad remained in council all day yesterday. It has transpired that the Southern Railway Association, which is the Pennsylvania Central in disguise, has been trying to get control of the Atlanta and West Point, the West Point and Montgomery, and the Montgomery and Selma railroads. The Atlanta and West Point is entirely under the control of the Georgia, and the Southern Railroad Association proposed a lease of this road to the Georgia. The Georgia Central is working to prevent any arrangement of this kind from being effected, and these two roads are trying to settle the terms of an agreement which will break up the little game of the giant Northern corporation. At the date of this writing, negotiations are still pending, but it is confidently stated that before the meeting adjourns the matter will be arranged satisfactorily to both parties.—*Augusta (Ga) Chron and Sent*, 24th.

DENVER & RIO GRANDE—A PRACTICAL TEST OF NARROW GAUGE.—On the results of this trial will probably depend the popular decision in favor of or against the general adoption of the narrow gauge system. To this neither the advocates nor the opponents of the system can reasonably object. All that either can ask is that no hasty conclusions shall be reached, but that the experiment shall be fairly and fully tried and that its result shall be regarded as establishing the utility of the system only so far as the conditions of success or failure are general, and not purely local. For example, there is every reason to believe that the section of narrow gauge now open will be a pecuniary success. It runs through a rich and prosperous mining country and ought to command traffic enough to make it profitable from the first. It must be remembered, however, that it will be subjected to no competition, that it is needed for the accommodation of a section now without facilities for transportation, and that local interests are largely represented in its control and, consequently, in its success. We can not, therefore, accept the mere fact that the D. & R. G. R. is a profitable property as answering the objections advanced against the narrow gauge principle. What is needed to show its practicability or impracticability is a careful examination of the practical workings of the road, the proportion of dead to paying weight, the cost of moving given quantities of different kinds of freights per mile on the narrow as compared with the standard gauge, the proportions of earnings per mile to cost of road and operating expenses, and such other matters as may be needed to establish a fair comparison between the two systems. Until this is done by competent and impartial engineers, we shall hesitate to change our often expressed opinion that no advantages can be claimed for the narrow gauge system which are not possessed by the standard gauge in a much greater degree when equipped with light rolling stock and economically operated.—*Iron Age*.

—The Selma & Gulf Railway has opened connection with the upper edge of Wilcox county to Allenton, about 30 miles south-west, and the Selma Times is strongly urging the people of that city, with their friends in Allenton and Camden (county site of Wilcox), to construct a narrow gauge line to Camden, about 30 miles—which it is estimated will cost about \$8,000 per mile. Camden is also on the projected (and commenced) line from Eufaula, via Greenville, to Meridian, known as the Vicksburg & Brunswick road, and of which Ex-Governor Shorter, of Alabama, was once president. One gentleman proposes to be one of one hundred men to build and equip the road.—*Atlanta Journal*.

—From General Echols, one of the directors of the Chesapeake & Ohio Railroad, who has been charged with looking after the interests of that company in Kentucky, we learn that its prospects are in every respect flattering. The division in West Virginia, from Huntington, near the mouth of Sandy, ninety-five miles eastward, has been completed and is in good running order. The Lexington & Big Sandy road is under contract from Lexington to Mt. Sterling, on the whole of which division work is being prosecuted vigorously. By early spring the remainder of the road will be put under contract. The city bonds of Lexington have been issued upon subscription account, and General Echols has disposed of a number of them to citizens of Lexington at 92.—*Yeoman*.

RAILROADS OF OHIO.

The forthcoming report of Hon. R. D. Harrison, Commissioner of Railroads for the State of Ohio, furnishes the following abstract of the Reports of Railroad Companies in Ohio, as made to the Commissioner, for year ending June 30, 1871.

Names of Companies.	Length of road and branches.	Cost of road and equipment.	Am't of capital stock paid up.	Amount of fund- ed and floating debt.	Earnings for the year.			Operating ex- penses for the year.	Net earnings for the year.	Interest paid on bonded debt during the year.	Div. on stock rate per cent.	
					Pass- gers.	Freight.	Total.				Preferred	Common
Atlantic and Great Western R'y. * Erie R. Co.	657	\$ 159,723 844	\$ 29,598,695	\$ 99,999,900	\$ 2975,773	\$ 23,485,382	\$ 26,461,155	\$ 23,991,799	\$ 2,469,356	\$ 293,886	.....	c7
Cleveland and Mahoning R. R.	19	3,147,934	2,056,970	1,209,600	2,647	3,191	5,838	3,402	3,166	.....	.....	5
Carrallton and Cneida Railroad	137	101,000	14,400	200	705,092	605,542	1,310,634	739,861	235,133	150,000	c 3	.....
Gen. O. R. R. (C. O. Div. B. and O. R. Co.) *	136	5,499,999	3,000,000	2,500,000	193,280	320,891	514,171	440,728	60,393	161,845	.....	.....
San., M. and Newark (Lake E. Div. R. Co.) *	45	3,219,465	910,623	2,308,842	.....	.....	.....	.....	.....	.....	.....	.....
Cincinnati and Baltimore Railway	55	723,152	263,650	359,502	420,154	553,392	973,546	696,824	519,982	145,060	.....	8
Cin., Hamilton and Dayton Railroad	140	5,320,769	3,500,000	9,032,000	308,602	730,986	1,039,588	6,149	408,756	297,610	.....	.....
Dayton and Michigan Railroad	42	6,612,015	2,393,145	4,393,335	72,103	90,287	162,390	129,248	40,491	43,750	.....	.....
Cin., Richmond and Chicago	20	947,885	382,000	645,885	116,045	162,774	278,819	222,167	66,267	143,500	10	.....
Cincinnati and Indiana Railroad	7	1,894,477	500,000	2,000,000	e1,667	e1,977	e3,644	e515	e3,129	.....	.....	.....
Harrison Branch Railroad	170	200,000	200,000	no debt.	96,037	189,354	325,391	285,183	40,053	.....	.....	.....
Cincinnati and Washington Valley Railroad	170	\$ 5,500,000	\$ 3,845,815	\$ 1,500,000	.....	.....	.....	.....	.....	.....	.....	.....
Cin., San. and Cleveland Railroad	220	\$ 5,830,817	\$ 3,406,596	\$ 2,421,221	\$ 261,432	\$ 468,177	\$ 729,609	\$ 524,912	\$ 275,788	\$ 158,922	6	.....
Columb., Spring. and Cin. Railroad	391	2,346,000	11,620,000	3,000,000	796,437	2,583,305	3,379,742	2,446,498	1,158,638	210,000	7	.....
Cleve., Col. Cin. and Indianapolis Railway	m 2	1,641,561	1,165,000	1,510,000	\$ 71,900	\$ 159,243	\$ 231,143	\$ 154,980	\$ 99,333	7,761	.....	.....
Cleve., Mt. Vernon and Del. Railroad	12	311,971	192,255	122,337	604,887	2,361,401	2,966,288	1,545,149	1,427,008	261,165	10	.....
Massillon and Cleveland Railroad	225	\$ 1,165,944	\$ 865,852	\$ 1,043,934	113,593	347,682	461,275	224,114	249,237	79,402	.....	.....
Columbus and Hocking Valley Railroad	31	602,584	82,350	540,350	51,963	59,815	111,778	95,588	22,995	9,800	.....	.....
Dayton and Union Railroad	13	332,283	129,550	47,919	9,771	82,153	91,924	78,436	17,778	2,240	.....	.....
Iron Railroad	98	4,664,580	3,065,000	3,123,776	15,065	154,923	170,000	260,009	39,300	2,511	.....	.....
Junction (Cin. and Indianapolis) Railroad	737	1,712,500	1,212,500	500,000	20,420	36,428	56,848	61,124	47,748	13,275	.....	.....
Lake Erie and Louisville Railroad	392	54,808,621	24,938,900	24,822,764	3,997,845	9,392,933	13,390,778	9,429,878	4,717,610	1,594,929	10	8
Lake Shore and Mich. Southern Railroad	276	21,710,312	13,980,000	9,986,220	438,649	1,010,766	1,449,415	1,052,092	1,167,610	533,444	.....	.....
Marietta and Cincinnati Railroad	225	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Marietta and Pittsburgh Railroad	224	711,865,500	305,000	800,000	.....	.....	.....	.....	.....	.....	.....	.....
Newark, Somerset and Straightville Railroad	35	1,112,557	500,000	627,419	2,692	195,865	198,557	154,160	81,137	73,022	.....	.....
Niles and New Lisbon Railway	393	\$ 30,863,793	\$ 24,630,610	\$ 6,833,793	\$ 1,158,157	\$ 1,883,780	\$ 3,041,937	\$ 2,297,940	\$ 798,211	\$ 456,886	7	.....
Ohio and Mississippi Railway .....	.....	17,065,162	5,424,350	12,578,073	.....	.....	.....	.....	.....	.....	.....	.....
Col., Chic. and Indiana Cent. Railway .....	.....	36,850,644	13,189,337	24,112,95	.....	.....	.....	.....	.....	.....	.....	.....
Little Miami Railroad	978	\$ 4,557,517	\$ 4,105,750	\$ 1,580,000	\$ 2,553,535	\$ 5,731,660	\$ 8,284,907	\$ 6,328,274	\$ 2,616,632	\$ 94,000	8	.....
Columbus and Xenia Railroad .....	.....	1,493,145	1,786,000	302,000	.....	.....	.....	.....	.....	.....	.....	.....
Dayton and Western Railroad .....	.....	80,000	stock sunk.	679,000	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburg, Fort Wayne and Chicago Railway	2503	24,926,440	18,714,255	13,680,219	2,423,576	5,320,458	7,744,034	4,296,335	3,811,309	1,084,825	.....	.....
Rocky River Railroad	5	117,817	75,862	33,662	13,227	0	13,300	8,251	5,049	2,121	.....	.....
Toledo, Waba h and Western Railway	631	33,770,000	16,000,000	17,700,000	1,236,331	3,494,248	5,113,384	3,543,125	1,570,318	1,231,173	7	.....
Totals—entire line and branches	61,175	365,778,316	120,387,148	117,552,701	16,333,218	39,296,617	55,629,835	40,296,667	18,948,260	7,505,432	.....	.....

Length, when completed, to be	6,536
Completed main line and branches in Ohio	3,457
Double track in Ohio	222
Sidings	623— 845
Miles of track in Ohio laid with iron	4,302

* Roads embraced are operated under one management the first named being lessee of the others.
† Operated by one organization 10 months of present year.

‡ Deficit \$93,618, deducted from total net earnings leaves \$18,854,742.

a Includes roads embraced.
b From former reports.
c Paid from rental.
d In process of construction; proposed length 23½ miles.
e For 2 months only.

f Not reported.
g Length ironed; proposed length 44 miles.
h In addition the company have 37 miles of road graded.
i Cost, stock and debt represent the whole 74 miles.
j Also operates under lease the Jamestown and Franklin Railroad, 51 miles.
k Road in process of construction; proposed length 110 miles.
l Road in process of construction; proposed length 44 miles.
m Cost as far as completed.
n Length completed; proposed length 432½ miles.
o As represented by stock and debt.
p A passenger road, carries little or no freight.
q Includes \$600,000 cost of construction and right of way of Dayton and Xenia branch.
r The road of this company is under lease to the Pennsylvania Railroad Company, transferred by them 1st April, 1871, to the Pennsylvania Company.

r Estimated. All equipment used is furnished by P., C. and St. L. Railway Company.
s Original cost.
t Building branch 10 miles; length completed 148 miles.
u In addition to length of road given, this company own an undivided half of the C. O. Railroad, between Newark and Columbus (33 miles) it being used in common by both companies.

The Marietta and Cincinnati Railroad Company, in earnings, operating expenses, etc., report expense of conducting their telegraph line.....\$26,918 28
And received from telegraph line.....6 345 54

Making the deficit of the road from this source.....\$20,572 74

A Includes \$3,521,582 89 from mail express, etc.

The Copper Product of 1871—The Figures in Full—A Fine Showing.

The figures published in the columns of the *Gazette*, last week, setting forth the production of copper on Lake Superior for twelve months ending the 1st inst., though incomplete so far as Keweenaw and Ontonagon counties were concerned, were nevertheless sufficiently approximate (as will be seen by the full returns given underneath) to warrant us in indulging in the felicitations we did, touching the business of the year. From our amended tabulated information on this head, we find that, instead of being 400 tons behind 1870, we are only about 100 tons of mineral in arrear, which agreeable showing furnishes an incitement, and permits us to again congratulate the region on such an exhibit of tangible wealth as only tends to confirm the high opinion already entertained of Lake Superior as a wonderful copper-producing section—second to no other in the world. Another great source of satisfaction is to be found in the fact that nearly every mine which

has been legitimately operated during the past year has earned a handsome sum over all expenses, while in one instance—that of the Calmut and Hecla—the profits have been enormous.

The following is the product of copper from the counties of Houghton, Keweenaw and Ontonagon:

PORTAGE LAKE DISTRICT.		
	Tons.	Lbs.
Calmut and Hecla	9,660	1,535
Quincy	1,505	1,074
Schoolcraft, Franklin-Pewabic, Houghton, Hancock and various tributaries	1,578	1,297
Total	12,744	1,906
KEWEENAW POINT.		
Central	905	673
Phoenix	879	440
Copper Falls, about	460	.....
Cliff	90	1,935
Canton	5	343
Total	2,340	1,391

ONTONAGON DISTRICT.		
National	295	1,700
Ridge, Minnesota, Flint Steel and various tributaries	694	1,746
Total	990	1,446

RECAPITULATION.		
Houghton county	12,744	1,906
Keweenaw county	2,340	1,391
Ontonagon county	990	1,446
Total	16,076	743
Total in 1870	16,183	39
Decrease in 1871	104	1,296

The money value of the copper and iron product of Lake Superior, for the year 1871, is about \$12,000,000.

The total product of the iron mines of Lake Superior for the past year will reach nearly 1,000,000 net tons of ore, while the make of charcoal pig iron will be over 40,000 tons.

Rotary Puddlers.

The Danks puddling furnace, in its mechanical arrangement, comprises, aside from the details of construction, a cylindrical chamber with end portions of diminished diameter and rotating upon a horizontal axis; one end of this chamber communicating with the furnace in which the flame is urged by fan-blasts, and the other with a flue or uptake; this end being closed by a detachable head while the apparatus is in use. The rotation of the chamber, duly charged with molten pig, of course insures the requisite movement of the metal, and consequently the results commonly obtained by the action of the puddler's tool. At the proper stage of the process the head of the chamber is taken off and the flue also moved aside out of the way, a large fork suspended from a crane is thrust in, a few turns of the chamber cause the ball to adhere to the fork, and the latter being withdrawn conveys the ball to the squeezing machinery. It is stated in our English exchanges that rotary puddlers of construction nearly identical with this have been, in more than one instance, tried in British iron works and found a failure. This, it is frankly acknowledged, was a result not of any fault in the theory of rotary puddlers, or even in their operation mechanically considered, but of the impossibility of keeping the lining or fettling in its place. This Mr. Danks claimed from the outset to have done by a method which we find described as follows: "The foundation for the lining of the cylinder consists of a mixture of pulverized iron ore and pure lime worked with water into the consistency of a thick paste. Upon the completion of the initial lining, a quantity of pulverized iron ore, about one-fifth of the total amount required to fettle the apparatus, is thrown in, the furnace is heated and made to revolve slowly until the iron is found to be completely melted, and the apparatus is then stopped. That part of the molten iron which has not been consumed by glazing the initial lining surface runs to the lowest level of the furnace, and there forms a pool into which there are put a number of small and large lumps of iron ore of such dimensions as will be required to allow the said lumps to project over the surface of the liquid ore by from two to six inches. This part of the fettling is allowed to set, when a fresh quantity of pulverized ore is thrown in. The furnace is again made to rotate slightly until the newly added ore is liquified, when the apparatus is again stopped and the pool is filled with lumps as before. The operation is continued in this way until the whole of the vessel is properly fettled. From 2 to 2½ tons of iron are required to fettle a 700 lbs. furnace." The practical difficulties previously experienced with this class of puddling furnaces being thus overcome, the real value of the principle is shown not only in the doing away of manual labor in the puddling operation, but in the production of larger balls at a single heat than would be done by the old method; in an increased economy of fuel and a greater yield from a given grade and quantity of ore. In the furnaces at Cincinnati, where the plan was first put in operation, puddled balls ranging from six hundred and fifty to one thousand pounds were conveniently made, and no special difficulty appears to have been met with in forming into a single ball the product of a heat of fourteen hundred pounds.

The inventor of this apparatus called the attention of English iron masters to his improvements some time last summer, in a paper read before the Iron and Steel Associa-

tion, with such effect that a commission was appointed to visit the United States and examine the actual working of the furnace. This commission left England early in October, taking with them about forty tons of Welsh, Staffordshire, Scotch and Cleveland pig, to be operated upon during the progress of the tests. These last appear to have proved to be all that was desired, if we may credit a telegram from the commissioners published in the English *Iron Trades Review*, and stating explicitly "Danks' furnace successful. Construct furnaces for ten cwt; squeeze or hammer single ball. Economy and quality satisfactory." It thus appears that an American invention is destined to take its place foremost among the improvements adopted by the greatest iron making country in the world, to say nothing of the favor it may meet with at home. We close our sketch with the appended description of the mode of operating the apparatus when in use:

"The iron is charged into the furnace either in a solid or molten condition. When charged in the shape of pig iron, the melting down occupies from thirty to thirty-five minutes, during which a partial rotation is given to the furnace from time to time in order to expose equally all sides of the charge to the flame. When the whole of this is thoroughly melted, the furnace is made to rotate once or twice per minute only during the first five or ten minutes, in order to obtain the most perfect action of the cinder upon the molten iron. A stream of water is injected through a stopper hole along and just above the line of contact between the floating cinder and the inner surface of the vessel on the descending side. A certain portion of uncontaminated cinder is thereby solidified on the metal surface, and is carried down into or below the bath of molten iron in a continuous stream, which, in rising up through the iron combines with the impurities of the latter in a far more effectual and complete manner than any mode of puddling hitherto known can effect. On the expiration of the said five or ten minutes, the iron begins to thicken and the motion is stopped. The heat is then raised so that the cinder shall be perfectly liquified, and the vessel is brought into such a position that the tap hole shall be just over the level of the iron, which by this time has become partly pasty. The puddler gently pushes back the iron and the cinder is made to run off. The heat is again raised and the furnace is put in motion at a velocity of from six to eight revolutions per minute, by which means the charge is dashed about violently in the furnace. A high temperature being kept up and the charge being continually over, the particles begin to adhere, when the velocity of the apparatus is lowered to from two to three revolutions per minute, upon which the ball then very speedily forms."

The puddler then solidifies the front end of the ball by a few blows from a tool applied through the stopper holes, and it is withdrawn through the end—opened by the removal of the head and the moving out of the way of the flue—of the chamber."

—A writer in the Savannah Republican says that a consolidation of the Polk State Quarry & Western Railroad Company has been made with the Atlanta & Savannah Railroad, and that after a careful inspection of the coal, iron, slate and copper mines of North-western Georgia and North-eastern Alabama, by engineers and geologists in the service of English capitalists, contracts have been made and delivered for the construction of a direct line of railroad from these inexhaustible beds of mineral wealth to Savannah.

Registration of Railroad Bonds.

The case of Judge Amasa J. Parker against the Chicago and North-western Railroad Company, recently tried before Judge Spencer in part 2 of the Superior court of New York, marks another fixed point in the ever shifting rules of directors and brokers. The customs of brokers and of the stock exchange are part of the general law, and are implied in every contract respecting stocks or bonds, unless there is some express stipulation which overrides the rules of 'change. What those rules are, however, are questions that are not always easily decided. It is to be feared that the practice of companies is lax in many respects where their own interests are not in question. It would be dangerous, therefore, to admit evidence of usage to override a common-law liability, unless the custom showed a user *nec clam, nec vi, nec precario*, but one that was openly, fairly and constantly observed—*semper ubique et ab omnibus*.

Now some duties on the part of corporations are so plain that it is hard to see upon what ground they could be denied or disputed. Judge Parker's case was one of this description. He bought through brokers three bonds worth \$2,000, of the Chicago and North Western Railroad Company. The bonds were apparently free, and were registered in the company's office in his name. Six months afterward it was discovered that the bonds had been stolen from the executor of a Mr. Olcott, and had been once registered in his name, but that the name had been erased so as to make the bonds appear free, and as such capable of being thrown on the market. Olcott's executor instituted proceedings against Judge Parker to recover the amount of the bonds. The Judge apprised the company and his brokers of the suit in order that they might defend it if they thought proper. No defence was made, however, by any of the parties, and judgement was recovered against Judge Parker for nearly \$3,000. He then brought suit against the company to be recouped this amount by them, inasmuch as it was owing to the negligence of their registering officer that judgment had been recovered against him. If the registrar had made a proper examination of the company's books he would have seen that the bonds were not really free, but had been already registered though the name was erased. Judge Parker averred that it was the registrar's duty to make this examination, and that if he himself had been promptly informed that the bonds had been already registered, he would have stopped his check for the amount.

The company averred that it was the brokers' duty and not theirs to examine the books in order to see whether the bonds were free or not. Judge Spencer, however, left the question of the responsibility of the company to the jury, who found against the company for \$3,335 41.

There can be no doubt that the duties of a registrar of stocks in the books of a public company are very different from those of a registrar of deeds and titles to land. A registrar in an office of the latter description will and ought to register every document presented to him for registration, if it relates to land within his district. He does not and often can not know whether the deed be void, voidable or valid. His registration is only like the stamping of the instrument. It is a condition *sine qua non* in the case of a claim for priority; but it is a mere negative condition, and does not impart any validity to a deed that is otherwise unsound. Neither

could it be expected that a registrar of titles to land should know the whole law of real property and take upon himself judicial functions, and so reject some deeds without more than *ex parte* evidence as to their true nature and operation. But the registrar of a company's stock requires no knowledge beyond that of book-keeping and of the rules of his company. These even, when contained in a statute, are copied from the previous customs of dealers, so that they are plain and intelligible to all. If an appeal is taken to the decision in Judge Parker's case, it will doubtless be founded on evidence to the effect that there is a custom more or less prevalent among members of the stock exchange to leave brokers to the unlimited use of their own caution. But the maxim *caveat emptor* does not apply to the stipulation which is implied in a company registering stocks in the name of a particular person. The fact of registration comprises a contract that the registration is valid. It is, as it were, an indorsement of a bill that is, in other respects, invalid against some of the names of alleged parties to it by reason of its not being passed. This is no ground of defense on the part of the party, who, of course, impliedly warrants the genuineness of his own signature.—*Albany Law Jour.*

Rights of Railway Ticket Holders.

The report of Judge Nesmith, referee in the case of Adaline Norris against the Grand Trunk Railway Company was brought into the Supreme Judicial Court of Maine, Judge Sargent presiding, lately sitting at Lancaster. In June, 1857, the plaintiff bought a ticket from Portland to North Strafford and stopped over at Northumberland. On the next train the conductor refused to recognize her check, and put her off, obliging her to take another conveyance. On the journey she took a cold that has ever since held to her. On the ticket was, "Good only for this train and the day received. Not good to stop over." Award \$600 and costs.

This decision is but another evidence that the courts intend to hold the railway companies to a pretty strict rule in favor of the public. Practically, this decision allows the companies no right to discriminate in the price charged between through and local travel, as a passenger may buy a through ticket regularly dated and containing a notice that it can only be used on that certain day and on a certain train, and yet the passenger may lie over at every station a day, and go on from station to station at his pleasure, no matter if a month's time is taken for the journey. Such a right might seriously interfere with the convenience of railway officials under certain contingencies obvious enough to those engaged in transporting large numbers of passengers. As long as the railway companies are allowed to discriminate in the price of local and through travel, they ought to be allowed to enforce such rules as will allow them to collect the regular price for local travel, and at the same time prevent the irregular crowding of passenger cars at points where it is impossible to procure extra rolling stock. While we are in favor of giving the traveling community all the rights that properly belong to them and holding the companies to a pretty strict rule, we do not forget that the companies have rights, which, if not respected, may result in great inconvenience in running arrangements, and possibly in unnecessary dangers to the traveling public.—*Times.*

Oil Creek and Allegheny River Railroad.

A meeting of the stockholders of this company was held in Philadelphia on the 19th inst., for the purpose of considering and acting on articles of consolidation and merger of the Union and Titusville Railroad Company with the Oil Creek and Allegheny River Railway Company. The stockholders adopted the merger by a unanimous vote.

The Oil Creek and Allegheny River Railway runs from Union along the Allegheny river to Oil City, from there to Petroleum Center and up Oil Creek to Titusville, and thence to Corry.

The Union and Titusville road runs from Titusville to Union, a distance of 25 miles, and there connects with the Atlantic and Great Western and Philadelphia and Erie Railroads, the road having three rails, thereby accommodating the wide and narrow gauges.

The acquisition of the Union and Titusville Railroad, it is said, will enable the Company to do business fifty per cent. cheaper than over the branch to Corry. The Pittsburgh connections with Buffalo occupy the Corry branch. The Union connection affords direct communication with Erie and the Lakes. The maximum grade is some forty feet to the mile less than the one running to Corry.

The capital stock of the Union and Titusville Railroad is \$700,000, bonded for \$500,000. The dividends are to be the same as the Oil Creek Company, viz: ten per cent.

This gives the Oil Creek Company nearly two hundred miles of single track. The passenger traffic on their road is \$1,000 a day.

Russian Railways.

The opening of a new line from Smolensk to Brest is expected to produce a complete revolution in the relations between Central Russia and Western Europe, as the distance over which goods will have to be conveyed will be reduced one-sixth. The distance between Brnberg and Moscow via Eydtukhmen and St. Petersburg is 1,852 verstes, while by Warsaw and Smolensk it is only 1,503 verstes. The abbreviation of distance between Vienna and Moscow is more considerable still; by St. Petersburg it is 2,307 verstes, and by Warsaw 1,888 verstes only. A commission left St. Petersburg in November charged by the Minister of Means of Communications with the duty of inspecting two new lines just completed for traffic, with a view to the working of trains being commenced upon them. These two new lines are the Warsaw and Rowstow and the Nikitskoy, a branch from the Donets Collieries to the Azow line. The Breslau and Warsaw has obtained authority from the Russian Government to extend its line from the Russian frontier via Seradz, as far as Ludza: it is authorized at the same time to establish a branch from Seradz to Kalisch. The Russian Government has granted a concession of a new line from St. Petersburg to the *embouchure* of the Neva, where it is proposed to construct a great port with docks and warehouses. A great bridge has been constructed over the Dnieper to carry the Krmentchug and Kroukow over that river; this line work is no less than 3,200 feet in length.—*Herepath.*

A Belgian inventor is using compressed air on a wheel submerged in water as a motive power, the air being applied beneath the wheel in the buckets, by its ascending gravity giving the wheel motion.

RAILWAY CROSSINGS IN CITIES.—The recent troubles in New York, connected with the opening of the N. Y. Central passenger depot, have evoked a report from H. Haswell, Engineer to the Board. He examined the roadway of the N. Y. and Harlem R. R. within the city limits over which the cars of various companies run, and to remedy the evils complained of, he recommends that the roadway commencing at Forty-second street be depressed as far as the deep cut at Sixty-sixth street; that the roadways at the intersection of all streets that cross it below the tunnel be bridged; that the roadway for its whole length from Forty-fifth street be walled in laterally for a height of five feet; that the line of the roadway from which it runs five feet above the grade of the avenue to Harlem river, be fitted with lateral walls between the line of streets, and at the streets traversing the road there be gates so arranged that when open the transit of the roadway across the street is obstructed, and contrariwise, when the roadway is open the tarnish through the street will be obstructed. The line of depth of 8 feet for the depression of the road is assigned for the triple purpose of not interfering with the shares through the transverse streets, of leaving sufficient space above to afford light and air to the passengers in the cars, and to render the height and consequent length of the transverse bridges the least practicable, consistent with the other conditions. The width of the depression between Forty-fifth and Fiftieth streets, where the requirements of the road exceed that of a double line of rails, should be subject to a decision when the plan of the proposed arrangement has been fully delineated, and the width of the roadway above Fifty-third street to be confined to that required for a double line of tracks alone.

COMMON CARRIERS.—CONSTRUCTION OF EXPRESS RECEIPT.—The plaintiffs delivered to defendants for transportation a package containing three cases of drugs, of the actual value of \$113.50 for each case, and took a receipt from the defendants for one package (three cases drugs). In this receipt it was specified and agreed that in no event should the holder of the receipt "demand beyond the sum of fifty dollars at which the article forwarded is hereby valued, unless herein expressed." Through defendants' default two of the cases of drugs were lost, and judgment has been given therefor at a valuation of \$50 each. The receipt of defendants was produced on the trial by plaintiffs, and was relied on by them as the evidence of defendants' obligation. On appeal, held that the parties contracted with reference to a package, which, as they yet expressed, consisted of three cases. They thus made reference to the particular subjects of their contract (*Woodruff vs. Conn. Mut. Ins. Co.*, 2 Hilt. 122, and case cited), and had in contemplation the necessity of defining with particularity their meaning of the word article, as constituting a designated part or number of the whole package. The effect of thus specifying the contents of the package evidenced that their minds contemplated something beyond its general description, and for the purposes of the contract extended its operation to the particularly designated articles as three cases, intended as distinguished from the term package. In *Earle vs. Cadmus*, 2 Daly, 237, it was decided that the term "any article" in such a receipt as in question, referred to any separate article. This decision is authoritative in the case at bar. Judgment affirmed. *Wetzell et al. vs. Dismore*, President of the Adams Express Co. Opinion by Robinson, J.

THE RICHMOND TUNNEL.—The City Council of Richmond, Va., has wisely provided for a double track tunnel under Church Hill, to cost only three hundred thousand dollars, instead of the single track tunnel at a cost of two hundred thousand dollars, provided for by an ordinance previously passed; and from the remarks of General Anderson we learn that Mr. Huntington will probably close in with the proposition made by the Council. This looks like business indeed. It assures us—this double track tunnel—that Richmond is to have from the Chesapeake and Ohio Railroad a freight business that can not be done through a single track tunnel; and, if not, of course it can not be done on a single track railroad. It assures us that we are to have all the advantages of our location; that any continuation of the road which may hereafter be made will be begun below Rocketts; and that the ground is already as effectually cut under the croakers as it will be from under Church Hill two years hence. As we have more than once before said, when the Chesapeake and Ohio Railroad is in full operation, every means of disposing of its immense freight should be ready here in Richmond. To be behindhand here, and choke up this important artery for want of relief here, would bring Richmond into contempt with all active and really live commercial communities.—*Richmond (Va.) Dispatch.*

SALE OF VIRGINIA RAILROAD STOCKS.—In accordance with the act of Assembly passed last session, the Board of Public Works will, on the 5th of February next, sell at auction the State's interest in all works or internal improvement, including 2,752 shares common stock in the Richmond, Fredericksburg and Potomac Railroad; 20,140 shares in the Chesapeake and Ohio Railroad; 4,910 shares in the Richmond and York River Railroad; one bond of \$4,000,000 of the Atlantic, Mississippi and Ohio Railroad Company, secured by a second mortgage on the road; a balance of \$427,000 due by the Richmond and Danville Railroad, secured by a mortgage; three bonds of the Alexandria, Loudoun and Hampshire Railroad Company for \$16,954 each; 74,000 shares preferred stock in the James River and Kanawha Canal Company, and 30,000 shares common stock of the par value of over \$281,000 in the Chesapeake and Ohio Canal Company; also shares of common stock in the Kempville Canal Company of the par value of nearly \$13,000; Ravenna Navigation Company, par value over \$269,000; Roanoke Navigation Company, par value \$30,000, and Upper Appomattox Navigation Company, par value \$60,000; also the State's interest in nine plank road companies, eighty-six turnpike companies and four bridge companies.—

—The operation of coking the Illinois coal, at East St. Louis, seems to be meeting with success. The process is different from that practiced in Pennsylvania, and is as follows: First, it is washed, after being crushed, to remove the sulphur, limestone and slate; then it is transferred to an air-tight furnace, where the remaining gas is consumed and nothing left but the pure carbon. The next process is to unite the distinct particles into lumps. Everything is done by machinery. The elevator used to raise the coal is seventy-two feet high. The reservoir used for hydraulic pressure contains ten thousand gallons, and is eighty-six feet above the ground.

—The liquid fuel experiments at the Laclede rolling mills are giving great satisfaction, and indicate a great revolution in the adaptation of fuel to smelting purposes.

TAXES ON TRAVELERS.—The United States Supreme Court has recently decided in the case of Ward vs. The State of Maryland, that State or city laws imposing a tax on commercial travelers, unless resident dealers are also taxed, are unconstitutional and void. This case was a test one brought forward by the society of commercial travelers. The laws complained of are very numerous in the States and cities of the South and West. The commercial traveler, indeed, although associated with recollections of the swallow, fine weather and hospitable enjoyment, has long been an object of dislike to resident traders in rural districts and to all who live by the same. The development of our internal trade, however, can not be impeded through regard for a prejudice which is unjust and narrow minded. There is no doubt that the travelers' society have deserved well of the country at large for their action in this matter. The law was clearly in their favor. A poll tax on a certain class of United States citizens, by a particular State, is obviously not a local though it is a personal assessment. It interferes with political statutes, and is equivalent to a tax on imports into the State. The question is now happily set at rest forever.—*Albany Law Jour.*

—The Dayton & South-eastern Railroad Company, organized to construct a road from Dayton through Montgomery, Greene, Fayette, Ross, Vinton, Jackson and Gallia counties, touching at Xenia, Jamestown and Washington C. H., to Gallipolis, have filed at the office of Secretary of State their certificate of incorporation. The capital stock is \$1,000,000. The incorporators are E. C. Ford, John D. Persinger, John Merchant, Samuel N. Yeoman, William Millikan, M. Willard and C. A. Balmer, of Fayette county; Mathew C. Allison, Eli Millen, Daniel R. Harlin, John Davis and Morris Sharp, of Greene county.

—The Galveston papers announce the sale on the 1st inst., of the Galveston, Houston & Henderson Railroad (in actual running order between Galveston and Houston), the sale being made under a decree of the District Court of the United States for the Eastern District of Texas, rendered on the 9th day of August, 1869, and affirmed by the Supreme Court of the United States. The purchaser was Mr. F. O. James, of New York, and the amount paid, \$675,000. The sale includes all the property and franchises of the road, except the bridge across West Galveston bay.

—A most valuable building and paving material can be found in the prophyry, or slag, of furnaces, when it can be cast in blocks or forms of sufficient homogeneity and convenient to handle. And it is a curious fact that thousands of tons of this material is annually allowed to go to waste. Properly constructed slag wagons, and giving the material proper time to cool in the proper manner, would utilize much of it, when the demand would sooner be greater than the supply.

—The net earnings of the Union Pacific Railroad Company for the ten months of 1871 were \$3,345,449, against \$2,242,963 in the same time last year.

—The new air power has been successfully applied at Brunswick, Maine. The air is compressed by a water-wheel and connected through a 2½ inch pipe underground three-quarters of a mile, and furnishes the motive agent for an engine at the railroad station used for sawing wood. [Rather far fetched.]

—Progress of the Hoosac tunnel in November; east end, 161 feet; central shaft (eastward only), 54 feet; west end, 131 feet, and 54½ feet of brick arch built. But 50 feet of the west end of the tunnel remain to be arched. Five thousand pounds of nitro-glycerine are used at the tunnel every month.

—A Londoner has invented a street lamp, with strips of looking-glass arranged in its roof, somewhat after the manner of a Venetian blind. It is said to throw three times as much light upon the street as the ordinary lamp.

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The Railroad Record.

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Cincinnati Interests.

We devote a very large portion of our issue of this week to matters of local interest, and among those that are not unimportant is the construction of the Tunnel entrance into the city, and the new works that are more or less connected with its success.

In another portion of our issue will be found the very interesting report of Colonel Porter. Although no really new facts are developed in reference to the value of the Tunnel as a railway entrance to the city, yet some are set forth in a very perspicuous manner, especially the gain of distance and time to all roads centering here. This alone would amount to a very considerable discrimination in favor of the city, as compared with the present imperfect and roundabout way of getting into the city.

The report of Colonel Porter is lacking in not setting forth more fully the present condition of the work, and in not showing how soon with the means at his command the work can or will be completed. This last is the great item of interest to the public. Of the value of the Tunnel when done, all are agreed, but some have lacked faith in its completion; hence there has been no reference to it whatever in the construction of the lines leading to or from the city. What the citizens want is a sort of definiteness of construction as demonstrated by the progress of the work from month to month. This we could hardly expect, at this early day, as it required some time to clear away the rubbish of a decade and a half of rot and decay. Now, however,

that the Colonel has got down to work, we trust soon to be able, monthly, to report progress. We certainly wish him God-speed.

SOUTHERN RAILROAD.

The discussion elicited in the daily press and on the floors of the Board of Trade, Chamber of Commerce and in the Council Chamber, in relation to the necessity, importance and mode of constructing the Cincinnati Southern Railway, are matters of vital importance to the business interests of the city, and has not failed to stir up an interest that by some was supposed to be lagging in this great work.

The truth is, that the leading opponents of the measure, are either sore-heads, in consequence of not having been appointed to the position of Trustees at the outset, or else they have by some means allowed themselves to become biased by a juggaboo of taxation, and the honeyed words of a great ring, that is making an effort to encircle the continent in the interest of cities on the seaboard (a ring that is liable at any moment, of its own weight, to burst asunder), until they have sunk so deep into their minds that they have destroyed their perceptive faculties.

Cincinnati was in earnest in reference to the construction of a Southern railway, and the recent movements against the measure, has given a reassurance of her determination that the work shall go on, without regard to the means used by short-sighted or interested parties to hinder or delay its construction. It has always had our hearty and undivided support, and we expect to continue it until we visit the "Sunny South" via the "Cincinnati Southern Railway." Push on the construction train, the opposition have now done "their level best," and the "obstructions" are removed. There is to be no more "fire in the rear."

Kentucky & Great Eastern Railway.

PORTSMOUTH BOARD OF TRADE.

The Portsmouth (O.) *Republican* of Jan. 5th contains the following important action of the Board of Trade of that city in relation to the construction of the Kentucky & Great Eastern Railway:

At the last regular meeting of our Board of Trade, the following resolutions were unanimously adopted:

Resolved, That the project of building a railroad from the mouth of Big Sandy to Cincinnati, Ohio, on the Kentucky side of the Ohio river, as contemplated by the Kentucky & Great Eastern Railroad Company, is regarded by this Board as of great importance to the city of Portsmouth.

Resolved, That a committee of three be appointed by the Chair to confer with the officers, and others actively engaged in said enterprise, and report to this Board what, if any, action should be taken by the citizens of Portsmouth in aid of said enterprise.

In accordance with the above, Messrs. Dugan, Hutchins and Rumsey were appointed a select committee having the matter in charge.

What are the Interests of Cincinnati in regard to Southern Railroads.

I see by the papers that meetings have been held by the Board of Trade, and resolutions introduced before the City Council, in reference to the Southern road. I don't know what has been the result of these movements; but I think I do know what the interests of Cincinnati are. They are, to my mind, as clear as daylight. In substance, they have been given in the RECORD, but there are some views which have not been fully given, because they have been suggested by recent events. One, and one of the most important of all, is that in reference to *discriminations* against Cincinnati, which are and will be made by any railroad company owned by New York and Philadelphia. Instead of Cincinnati being the gainer, by the fact that the great railroad lines of the East are coming to her, she will be really a loser in trade and manufactures, unless these discriminations against her by great foreign corporations can be prevented or counteracted. You see by the papers that the Pennsylvania road is not only leasing the East Tennessee lines, but is attempting to get the main Georgia roads. If it succeeds this mammoth corporation will no doubt try to get the South Carolina road from Augusta to Charleston, through this place. In one word, the Pennsylvania corporation, by leases, is attempting to control all the main lines in the South. Now what is the object of all this? It is not merely to make a great railroad, which shall be profitable. That is already attained, and perhaps better than by making three extended connections. What is the object of these leases by the Pennsylvania road? The object is to give Philadelphia the command of the local trade, which the cities of the West and South have had and ought to have. This has been successfully begun by the system of discriminations, and unless something is done to check it, a Southern road, although in itself of the greatest possible importance to Cincinnati, will be practically of little more value than the road to St. Louis. Why? Because, if built by the Pennsylvania road, that corporation will control it in the interests of Philadelphia. No interests of Cincinnati will be regarded at all. I used to think, as nearly everybody seems to think, that if the Southern road is only made, it is no matter by whom. Let us have the road. Certainly the road made by anybody will be better than none, and there are many articles of produce and manufactures in which Philadelphia can not compete with Cincinnati. So far it will be well, much better than nothing. But it will be a grand mistake that a Southern road controlled by Philadelphia will be of the same value with that road made by Cincinnati. I am told that the Pennsylvania road, controlling other roads in Indiana, is at this time carrying freight from Philadelphia to the west side of Indiana, at the same cost that it

is carried to Cincinnati, while the freight from Cincinnati amounts to the same. What is the result? Simply, that it costs a Philadelphia merchant no more than it does a Cincinnati merchant to put his goods on the west side of Indiana. Standing, then, on a perfect equality, the Philadelphia merchant, with larger capital and quicker European connections, will have the advantage. Thus Cincinnati loses the advantage of her position. What nature gave her she loses by artifice. This artifice is a modern invention, and could never have existed till the age of railroads came. But if it be not counteracted, Cincinnati will lose a large part of what she might gain by a Southern road. Yet I see that it was urged before the Board of Trade that Cincinnati ought not to go on with her plan of making the Southern road (which I supposed had been settled by a vote of the people), because there is a chance that somebody else will make it. Suppose they do, will that be in the interest of Cincinnati? What has ever caused Cincinnati to move in this matter but a regard for her own interests? If Cincinnati ever had an interest in making the Southern road she has it to-day with tenfold force! Because now the system of discriminations against her is openly begun and avowed. The argument that the city should not make the road is just saying that the city should do nothing for itself. Every dollar laid out by the city for any public object, streets, waterworks, &c., is laid out for its own interest. If the Southern road then be clearly and solely for the great interest of the city, there is no reason why the city should not advance money to it, which will not apply with equal force to any public works. The real question for the people of Cincinnati is not how much the road will cost, nor in what way the money shall be raised, but is the Southern road, controlled by the city or by the people of Cincinnati, a matter of vital necessity to this city? I think there is no man acquainted with the business of the city, and its relations to the South, will hesitate to say, that the control of one great line to the South, by the people or city of Cincinnati is of vital necessity. Cincinnati was a larger town than St. Louis when Chicago did not exist. Then, Cincinnati could sell her produce and manufactures to St. Louis itself, and beyond Chicago. But now there is a total change. You can sell your produce and manufactures to half way from Cincinnati to St. Louis and Chicago; that is, to the middle and west of Indiana. That is all you can do. But that is not the worst of it. Here comes the Pennsylvania road, and says, you shall meet Philadelphia on equal terms in the very district which is supposed to be tributary to Cincinnati! I will not stop to comment upon this state of affairs. I think if Cincinnati submits to that she deserves to be a village. The truth is, the city of Cincinnati is cutting its own throat, and bleeding to death by its own

acts! What are they? By permitting the Pennsylvania road to pass through Cincinnati, West and South, without conditions. But on the South Cincinnati is not limited, provided always she has control of the road. The South is a mine of wealth to Cincinnati if she only understood it. St. Louis and Chicago can not compete with her, but *Philadelphia can*; and that is the precise object of the Pennsylvania road in all its proceedings.

Ever yours, Mr. RECORD, E. D. M.
AIKEN, S. C., Jan. 3, 1872.

Death of James Fisk, Jr.

The death of this distinguished individual is an event of no ordinary occurrence; the tragic method by which it was accomplished commands our sympathy, despite any abhorrence that may be entertained at the supposed or alleged causes that preceded and may have led to the commission of the fatal crime.

As a business journal, we have nothing to do with the *moral status*, or weaknesses of the deceased, they were entirely his—he has made up his accounts and the balance is struck, we only have to look to our own.

It is with his career and services as a "railroad man" alone that we have to deal; in this we contend that he has stood pre-eminently above his fellows—a very giant among giants. He has made the Erie Railroad that was a by-word and a hissing, the most perfect and reliable thoroughfare in the country,—perfect in all its appointments, on which and by which the comfort and convenience of the traveling community is more fully consulted, and the interests of the business community more carefully guarded than on any other. That he has stood as a bulwark against the monopoly of the other great lines, is most undeniable, and the country—the great West—as well as New York city has had the benefit of it. That it may have been at the cost of stockholders is not for us or the business community to inquire into, but certainly not any more than in the hands of the pious Drew!

A great meteor has been blotted out of the railroad firmament, and while we may be allowed to drop a charitable tear over his untimely tomb, and with the mantle of charity cover up his error, leaving them with him and his God, we confess that we should hail with delight a successor to his position with one-half the capacity and an equal determination in protecting the interests of the general public in the great conflicts of the monster corporations that are now controlling the vital interests of the country. Peace be to his ashes, for with all his faults we could ill spare him at the present time.

— The locomotives of this country have consumed, it is said, during the past twelve months, \$56,000,000 worth of wood; and it is estimated that 150,000 acres of the best timber land in the Republic are cut down every year to supply the demand for railway ties alone.

Cincinnati Railway Tunnel Company.

REPORT OF THE ENGINEER.

To A. J. Hodder, Pres't Cincinnati Railway Tunnel Co.:

In taking charge of the work of the tunnel, my first object was to ascertain its condition, as nearly as possible, in order to determine the practicability of completing it in the time required in the contract with the parties undertaking the work.

From a report made at the time the work was suspended, the following statement shows what progress had been made at that time, to-wit:

2,011	lineal feet completed.
972	" excav't'd and side walls laid.
191	" excavated and ready for masonry.
1,430	" drifted and $\frac{1}{2}$ excavated.
603	" drifted only.
4,804	" to be excavated in full.

10,011 Total length of tunnel when compl't'd.

The same report goes on to say that the amount of work done is equal to one-third of the whole, not including the sinking of the three shafts at a cost of \$24,250. Upon a careful examination I find this statement to be correct, and that most of the work done by the former contractors is in a good condition, showing it to have been built in a substantial manner, and, as far as I have been able to penetrate the approaches at the two ends, believe the repairs required on the old work to be small compared with the work remaining to be done.

The three shafts being completed, it will only require the water to be pumped out to enable the contractors to proceed with the work of the tunnel proper.

This condition of things will greatly facilitate their operations, and enable them to complete it in a much shorter time than would be required had the shafts to be sunk before the excavation could be commenced, and it is safe to say the whole can be completed in eight months from this date, and much within the time required in the contract.

Of the value and importance of this work as a railroad connection, and to the city of Cincinnati, it is difficult to form an estimate. But it is safe to say that it will exceed the expectations of the most sanguine of the friends of the enterprise; it will connect the great lines of railroads in Ohio with those of Kentucky.

The building of the tunnel road will secure two if not three of the existing roads, that are now dependent on other roads for the right to come into the city of Cincinnati, and subject to great inconvenience for want of room to transact their business; while this entrance into the city will give them abundance of room, and a good landing in the center of business, and where much of the

heavy freight can best be discharged and received for shipment.

Without the proposed Tunnel road, the Kentucky & Great Eastern and the Cincinnati & Great Northern Railroads could not be accommodated, nor make their connections within the limits of the city, nor build convenient depots for the delivery of lumber, coal or iron ore, to say nothing of common freight; but where this new channel is open to them, they will be enabled to land all kinds of freight in a depot of easy access, where it can be cheaply handled. The same may be said of the long roads above alluded to, which are subject to the controlling lines, that can give them but poor accommodations, for want of room, to do a large business.

There is little doubt of the result of opening this new road into the city; and it is confidently believed that there will be more applications for permission to enter through the tunnel than can be accommodated.

Roads from the north can connect at Sharon, and at other convenient points between that town and the city, and save distance and time in reaching their destination; and can at all times land their passengers in advance of those making the circuit of Cincinnati, as they are now compelled to do.

The advantage of having the freights landed near the center of business, especially for all heavy freights, will secure to these roads a full share of the business of transportation. Roads using this line will have the control of most if not all freights brought here by the Kentucky lines, affording better facilities for transferring all goods and merchandise, and can offer better accommodations to the traveling public, and a saving of time and expense to all through passengers.

This connection is of the first importance in working these roads successfully, and in bringing trade and commerce to the great center.

Should none of the independent lines avail themselves of the advantages of this new channel, the dependent ones, that must use it, will give returns sufficient to warrant the building of a tunnel costing twice that of the one under construction. But as this tunnel is certain of having the business of two additional roads, extending, when taken together, from New York city via Cincinnati to the Straits of Mackinaw, there is every inducement offered to capitalists for investment in this new enterprise.

The last two roads referred to will meet in Cincinnati, forming a connection between the North and East, bringing their freights from extreme parts of the country, thereby making this new link a necessity for the exchange of commodities. It will also form an important link in the great chain of railroads between the city of New York and St. Louis, and other cities of the West.

By this new route, passengers and freight

can be conveyed to and from the Atlantic cities in less time and at less cost than by any other route, having from one hundred to two hundred and forty (100 to 240) miles less distance to run, as will be seen by consulting the following table of distances on all existing roads running between New York city and Cincinnati, compared with the new route connecting with the tunnel:

	Miles.
Distance by the New York Central.....	880
Kentucky & Great Eastern.....	640
Difference.....	240
Distance by the Erie (A & G. W.).....	861
Kentucky & Great Eastern.....	640
Difference.....	221
Distance by the Pennsylvania Central.....	746
Kentucky & Great Eastern.....	640
Difference.....	106
Distance by the Baltimore & Ohio.....	777
Kentucky & Great Eastern.....	640
Difference.....	137

Showing that the shortest of the existing lines between the cities named is 106 miles, and that the longest named is 240 miles more than the new line proposed to be built—equal to eight (8) hours' time when compared with the longest, and three (3) hours' time when compared with the shortest of these lines; and by equating the four existing roads, the saving in time and expense to the traveling public and to business between these cities is eighteen (18) per cent. in favor of the new line.

The low rate of speed (6 miles per hour) imposed on all roads now entering the city, is another item, and equivalent to distance in the comparison, as these roads are compelled to consume one hour (in running six miles) in entering the city, which in running time is equal to twenty-six (26) miles of additional road; and this, added to all existing lines running into Cincinnati, gives a fair comparison, showing the importance of some better way of getting into this city; and it can only be accomplished by the tunnel route. So that all roads entering the city by this route will save—should the two miles through the tunnel be reduced to a speed of twelve (12) miles—from sixteen to twenty-three (16 to 23) miles in running time, and from three to five (3 to 5) miles of actual distance over the old routes now in operation. This will be apparent by consulting the following table:

	Miles.
Little Miami—Distance from Morrow to Cincinnati by present line.....	36
Distance by Tunnel route.....	31
Difference.....	5
To which add time lost in entering the city by the present route, equivalent to.....	20
In favor of Tunnel route.....	25

Marietta & Cincinnati (B. & O.)—Distance from junction with Tunnel route to Cincinnati by present route.....	10
Distance by Tunnel route.....	5

Difference..... 5

To which add time lost in entering the city by the present route, equivalent to..... 16

In favor of Tunnel route..... 21

Cincinnati, Hamilton & Dayton—Distance from Hamilton to Cincinnati by present route.....	25
Distance by connecting with the Tunnel route.....	22

Difference..... 3

To which add time lost in entering the city by present route, equivalent to.... 16

In favor of the Tunnel route..... 19

S., D. & C. (N. Y. C.)—Can save in time equivalent to distance, by connecting with Tunnel route.....	16
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Atlantic & Great Western—Distance from Springfield to Cincinnati by present route.....	81
--	----

Distance by the new line, via Xenia, Lebanon and Sharon, connecting with the Tunnel route.....	74
--	----

Difference..... 7

To which add time lost in entering the city, equivalent to..... 16

In favor of Tunnel route..... 23

The trains on the Hamilton & Eaton Railroad, and the Indianapolis Junction Railroad, are subject to the same low rate of speed in running into the city as the Hamilton & Dayton, and will be equally benefited by availing themselves of the advantages offered by the Tunnel route.

With these advantages a full share of passenger travel and freight will seek this new route, dividing it with the longer lines passing around the city to reach their depots. All these advantages secured to the traveling public, and to business, will enhance the value of this new link—the Tunnel road.

Passengers leaving New York on the new line at the same time as those on the more northerly lines, will reach Cincinnati from four to eight (4 to 8) hours in advance, and save the expense of from one hundred to two hundred and forty (100 to 240) miles travel. And passengers for Dayton, Indianapolis, and places to the west of those towns, will save two hours time and forty (40) miles travel by taking this route; and those for St. Louis, Louisville, and places intermediate, will reach their destination also four hours in advance of the northern routes, and save the fatigue and expense of one hundred (100) miles travel. And the existing roads taking the Tunnel road will save nearly one hour in time, and be better accommodated, than those roads of the same length entering the city from the north and east, by present routes.

Trains entering the city by this new route

will not be restricted to any given rate of speed as that of roads which cross the streets at grade, as this road will pass over or under all the streets; consequently, such rates of speed can be adopted as will secure safety in passing through the tunnel as the company shall choose. This will be a great saving in time in entering and leaving the city.

The importance of Cincinnati as a railroad center has not been overlooked by railroad men, which will be readily seen by consulting the map of the city and surrounding country, and still more when we consider the rapid increase of population, and the growth of her manufactures, and increasing commerce in the last ten years. From a report of the Board of Trade now before me I find the following:

1850, population of Cincinnati.....	115,000
1860, " "	179,000
1870, " "	275,000

And in 1869 the number employed in manufacturing was	59,000
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And the value of manufactures reached the sum in 1860 of	\$46,995,067
In 1870	127,459,621

Increasing in ten years.....	\$80,463,954
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Imports in 1869 amounted to...	\$282,927,962
" " 1870 "	312,978,665

Increase in one year.....	\$30,050,763
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Exports in 1869 amounted to...	\$163,084,358
" " 1870 "	193,517,690

Increase in one year.....	\$30,433,332
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Coal delivered in 1860, bushels ...	14,600,000
" " 1870, "	30,300,000

Increase in ten years.....	15,700,000
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It will be seen from the above that the population has been increasing at the rate of 55 per cent. every ten years for the last twenty. And there are reasons for believing that the same rate of increase will continue for the next ten, which will give Cincinnati 430,000 inhabitants in 1880.

The manufacturing interests have increased in a greater ratio than the population, being 177 per cent. in ten years. With the same rate of increase for the next ten, in 1880 they would reach the large sum of \$353,000,000 more than the manufactures of Philadelphia in 1870.

Cincinnati is now the fourth city in the United States in her manufactures, and should she go on increasing in this department of industry at this rate, in 1880 she will be the third if not the second.

The gradual increase in her imports and exports show a healthy and permanent growth; and should these increase for the next ten years as in the last two, her imports would reach the sum of \$811,841,400, and her exports the sum of \$501,442,700 in 1880.

The coal, iron and lumber trade is increas-

ing with the increasing demand for general consumption and manufacturing purposes.

The coal shipped to this city in 1870 shows an increase of 100 per cent. in ten years. Of this large amount of coal to supply the city of Cincinnati, a large portion will come from the coal fields of Western Virginia, and Eastern Kentucky, and during the seasons of low water in the Ohio river, a large amount will be brought here by the Kentucky & Great Eastern Railway, when that work is completed; and by connecting with the Cincinnati & Great Northern, via the Tunnel route, will enable the shipper to deliver it at lower rates in towns along the Northern line than when shipped by any other route.

By completing these two roads, together with the Tunnel to connect them, the facilities for moving coal, lumber and iron, and all other kinds of freight, to and from Cincinnati, will be superior to any now existing, and is what the business demands.

Taking the least favorable view of the Tunnel Railway, it will be safe to say that the earnings will, without doubt, be fifteen (15) per cent. on a capital of two millions (\$2,000,000) of dollars. That the completion of it has become a necessity for the accommodation of railroads, and to the prosperity of Cincinnati, and is of more importance to it than any one channel of communication now open to the city.

The building of the Tunnel and the two roads connecting with it, together with the existing roads, will make Cincinnati the great railroad center in the valley of the Ohio.

When the Tunnel road is completed, there will be a large amount of short travel from Avondale, Woodburn, and places more northerly, which will add to the business of the line. Besides this, the country beyond the northern approach, on both sides of the line, for several miles to the north, is beautifully situated for the building of villas, equal to any of the locations outside of the city, and will offer inducements to persons doing business in the city, to make their residences in these localities, as they can be accommodated at any hour of the day, in passing to and from their business, with little expense and fatigue. Another inducement to locate on these grounds will be the low price at which they can be obtained, compared with land within the city limits.

Trains can be run hourly without interfering with the regular business of the road. This is done in all Eastern cities, and the short trains pay better than any others running on those roads.

Much more might be said in favor of this enterprise, in which not only the public but Cincinnati is deeply interested. But the above is deemed sufficient to convince any and all of its importance.

All of which is respectfully submitted

MARVIN PORTER, Chief Engineer.

CINCINNATI SOUTHERN RAILROAD

DISCUSSION ON 'CHANGE SATURDAY.

Two Reports from the Committee.

[From the Cincinnati Gazette.]

On 'Change last Saturday, the committee to whom had been referred the resolutions of Mr. Theodore Cook declaring the project for building a Southern Railroad under the Ferguson bill "dangerous in precedent and unsound in policy," presented the following preliminary report:

To the President and Members of the Chamber of Commerce:

Your committee, to whom was referred a preamble and resolutions touching the Cincinnati Southern Railway, introduced into the Chamber on the — day of December, are unanimous in the opinion that the importance of the subject to the tax payers and business men of our city is such as to warrant its being regarded a proper subject for discussion and expression of opinion by the members of the Chamber.

The preamble and resolutions, as originally offered, are therefore presented by your committee, with the recommendation that they be submitted to a vote of the members, by ballot, on Monday, the 8th inst.

In order to give ample opportunity for the members to vote, it is recommended that the time allowed for voting be two hours—from 12 M. to 2 P. M.—and that two judges, to be appointed by the President, together with the Clerk of the Chamber, be stationed at the ballot box to receive and keep a record of the votes, and to count the ballots and report the result after the vote has been taken.

It is also recommended by your committee that the question be presented in the following form, viz.: "Shall the Cincinnati Southern Railway be built by the city on the Ferguson plan? and that two sets of printed tickets be provided, to the number of 2,000 each. Upon the one set shall be printed: "Shall the Cincinnati Southern Railway be built by the city according to the Ferguson plan? Yes." And upon the other set shall be printed: "Shall the Cincinnati Southern Railway be built by the city according to the Ferguson plan? No."

After the election, and when the tickets have been counted, if it be found that a majority of the members have voted "yes," it shall be held that the preamble and resolutions have been lost; but if it appears that a majority of the members have voted "no," then it shall be held that they have prevailed, and that they express the sense of the Chamber.

THEO. COOK,
JAMES H. LAWS,
SAMUEL DAVIS, JR.,
ROBERT MITCHELL,
J. J. EMERY.

Mr. Cook stated that two reports, a majority and a minority, had been prepared by the committee, but as it would require much time to read them, he asked permission to give them to the public through the newspapers. Granted.

Mr. Richard Smith now moved to amend the report of the committee as presented and read, by inserting, in place of "Shall the Cincinnati Southern Railway be built by the city on the Ferguson plan?" the words "Shall the Ferguson bill be repealed?" and remarked:

"I take the ground that the naked, plain

question should be put in so many words, so that it can not be misunderstood. I know that there are many people in favor of the road who would be glad to have it built in some other way than by the city. The only plan that we have under which Cincinnati can build this road is that presented by this bill, and if it is repealed the city has no power to do anything. If it is not repealed, there is no power on earth that can prevent the Trustees from going ahead with it. I have noticed that the Law Committee of the Council has recommended the Auditor to refuse to issue the bonds. Let the Auditor dare do that, and he will find himself in jail within twenty-four hours. If we are in favor of this road, this law must be sustained. If we are not in favor of it, let us have the law repealed. Let us sustain these Trustees, and make them masters of the situation, and then they will be in condition to dictate to parties proposing to build, instead of being dictated to by any corporation. [Applause.]

After some further discussion the amendment was adopted, but the committee finally adjourned without adopting the report as amended.

The following are the two reports:

THE MAJORITY REPORT.

To the President and Members of the Chamber of Commerce:

Your committee offer the following as among the reasons which induce them to urge upon the Chamber the adoption of the preamble and resolutions:

The plan of building a railway three hundred and forty miles, at an estimated cost of ten million dollars, to be paid for in bonds of the city, has its origin in Cincinnati. So far as your committee are advised, there is no precedent for such an expenditure by any municipality for any such purpose. We are then to make the precedent, and risk the experiment. For this large expenditure we are to get a single line of railway from this city to the South.

While all our citizens concede the necessity for a line or lines of railway which will make a Southern outlet for our trade, many seriously doubt the wisdom of building them at the expense of the tax payers, and especially where it is proposed to spend so large a sum on one road, a great portion of which will pass through a mountainous, sparsely settled and unproductive country. It can not be shown that the road, if built, will pay the interest, or any considerable portion of it, on the bonds issued to pay for it. It will pass through no cities or town of large population, or any thickly settled country. Therefore, it can not be assumed that the road will have any profitable local business for many years, from which railroads generally acquire a large portion of their earnings.

No part of the contemplated work is in the city of Cincinnati, or in the State of Ohio. Aside from the legal questions that exist in respect to the authority of the city government to carry forward this great work, and to pledge the property of the people for the means to do it, there are questions of jurisdiction not only difficult in themselves, but subject to future complications, through the action, and possibly the adverse action, of the States through whose territory the road is to be constructed. Who can vouch for the conduct of the Legislatures of Kentucky and Tennessee? Already the Legislatures of several States are regulating the concerns of railway corporations within their limits, prescribing rates of fare, and in other ways interfering in their economy. Will not the real or

imaginary interests of the people, or of cities competing with Cincinnati, come in with political interests to render the road as burdensome as possible, or as little productive as possible, to those with whose money it was built?

There is a matter worthy of the most earnest consideration. By no law can the Legislature of one year bind that of another. A law passed with great difficulty—if passed at all—at one session, may be repealed or destructively modified at the next. To disoblige and obstruct a foreign municipal corporation in favor of one at home will always be popular; and the new element which such a work would introduce into the politics of another State, the interests of the work itself, or the right of its proprietors, would be little consulted.

The sixth section of the act is exceedingly objectionable. The compensation of the Trustees is not fixed or limited, but is left to the order or decree of the Superior Court, without instruction. The allowance by the Court is to be made necessarily upon the ex parte representations of the Trustees themselves. Employers and employed frequently differ as to the value of services rendered. Such a difference might arise here, but the difference of opinion would not avail the city. We know how liberal the courts are in making allowances of this character.

There is a popular belief, and it is sedulously cultivated, that the Trustees are limited to an expenditure of ten millions of dollars. This is not the case, and many persons will be surprised to learn that there is in fact no limit whatever upon the expenditure which may be made.

The first section of the act, after providing for the appointment of Trustees, and authorizing them to build a railroad, grants them the power to borrow a sum not exceeding ten millions of dollars for that purpose, but this limitation extends to the power to borrow money and no further.

The third section authorizing the Trustees to expend said fund and to make all contracts necessary to be made in building a first class road, who can doubt the liability of the city upon contracts to be made, regardless of the amount of that liability?

It is claimed by the Trustees, and those who have written and spoken for them in the discussion of this question, that this road must be built by the city, so that it may be "operated in the interest of the city," so that we may "dictate rates," &c. We are to have no partnership with other roads, for fear of a discrimination against our city. Now what does all this mean? There is nothing said about operating the road in its own interests, so as, if possible, to make it earn the interest on its cost. It is to be operated in the interest of our manufacturers, and we are to "dictate rates for freight and passage."

When we consider that there is, and always will be, a difference of opinion and warfare among manufacturers as to classification by roads of their various products, and consequent charges made for transporting them, we can discover the probability of a monopoly of advantages to that particular class or set of manufacturers and producers who may possess the largest influence with those who will have the dictation of rates. If the road be built at all by the city, let it be operated with a view of earning the interest on its cost, and this idea of favoring any special class, at the expense of those who are taxed for the creation of this great fund, be abandoned. Any other idea is grossly unjust.

If the theory that the city must own railroads, in order that they may be operated in

the interest of any part or all of its citizens, be a good one, why not use a part of this \$10,000,000, which it is proposed to spend on a single line, in the purchase of some of the broken down roads leading from our city into the heart of a thickly settled State, from which we derive a large trade? Or why not secure further legislation, and obtain the right for the city to purchase all the roads terminating here, and operate them in the interest of our citizens, dictating rates, &c.? If the principle is good, why not extend it?

The Trustees claim that the road can be built for \$10,000,000, and that when built it can be operated so as to pay the interest on \$10,000,000 bonds. If this be so, and the Trustees are able to convince any but themselves that it will prove true, the road can be built at once, without aid whatever from the city or any new charters from Kentucky, granting also to the Trustees the right to dictate rates and its operation in the interest of the manufacturers or any other class of citizens. Your committee, in answer to the oft repeated question of the Trustees: In what way other than by the Ferguson plan can we get the road? Answer—Make good your estimates, which you have stated as facts, and the road can be built at once without any citizen being taxed a dollar to pay for it. It may as well be admitted, however, that the road can not be built and equipped for the \$10,000,000, notwithstanding the statements in Mr. Bonte's carefully prepared and authorized speech, delivered in the presence of some of the Trustees, that it could be done, including an independent bridge over the Ohio, which, with the necessary appendages, would make the cost of the first mile of road built at least \$2,000,000, or one-fifth of the whole sum. It has been charged as presumption on the part of citizens to question the estimates of the engineer employed by the Trustees in the survey. These estimates and statements are, to say the least, so far in a very crude condition. No estimate in detail, so far as we know, has been presented. Eminent engineers of large experience in building railroads, who have no possible motive in opposing the building of the Chattanooga road, have informed us that to build a good road to Chattanooga, and equip it properly, will cost more than fifteen million dollars, without any charge for interest on investment or right of way. We doubt if any engineer of reputation, not in the employ of the Trustees, can be found who will place the cost at less than this sum; some put it as high as twenty million dollars, including the interest on investment while building. We will give Mr. Gunn all the advantages he may claim for getting through the mountainous parts of Kentucky and Tennessee, and assert that no engineer of first class reputation can be found to agree with him. Roads now being built for cash through a country in all respects more favorable than any of the projected lines of the Chattanooga road, are costing very considerable more than his estimate. Therefore we feel that it is not presumption, but our right, to question and criticize his estimates. We feel that we hazard nothing in saying that when this road is built and equipped, ready for business, it will have cost the city more than fifteen million dollars, which, added to our present debt, will amount to nearly twenty-one million dollars.

Some of the advocates of this scheme are supposed to look with pride at a big city debt, when we can have a railroad on our hands to represent it. They see all possible good in the railroad, and no evil in the debt. If the city builds the road it may, some day, become a question whether the best disposition of it is

not to give it away to be rid of it. Debt is that which taxes capital employed in business out of existence, or compels it to go elsewhere.

The history of public improvements of this character, built by municipalities, is certainly against this proposition.

Numerous illustrations in various cities and States, as well as in the General Government, might be cited. That economy and the prudence that govern men in their own business, indicates some other plan for building this road than the one now proposed. What other plan or plans are proposed?

It is believed that if the Constitution does not prohibit the city from building a railroad and owning it, that it also does not prohibit the giving away of a comparatively small sum in aid of building the road—that the greater includes the less. This opinion is held by some of our best lawyers. If it be correct, an act of the Legislature enabling the city to do this can be speedily had. In case this fails, there is hardly a doubt but that the Constitutional Convention, which has been ordered to meet this year, will, through an amendment submitted to the people for their approval, afford us an opportunity of aiding in the construction of railroads. This plan, carefully guarded, is surely much wiser and safer than the present law.

We have reason to believe that the city, through such means, is permitted to aid in the construction of railroads, that for a sum less than one-third of that required to build this road we can obtain roads to Knoxville, Chattanooga and Nashville, securing to us all the advantages which we could derive from roads if the city owned them.

Indeed, it seems probable that the time is not remote when we may have one or more roads to the South without paying anything for them. The railroads centering here are not likely to long lie idle with this inviting field before them. If money can be made on the investment here, there will not be wanting those who will find it an inviting field for operations; in fact, it may be stated that if there had been no agitation of the subject as a municipal, it would by this time have been seized upon as a private enterprise.

We wish, before bringing this report to a close, to place upon record our emphatic denial of the truth of the oft repeated statement that the fate or the future of Cincinnati depends upon the building of the Southern Railroad. We do not believe it, nor do we believe that the idea is seriously entertained by any whose judgments are worthy to be adopted as guides for the opinion of others. Such a work would undoubtedly be convenient and beneficial—would give a fresh impulse to the growth of the city, and be a perpetual contributor to its wealth and population. But it will not do to purchase even benefits at too dear a rate, and there are an abundance of prudential maxims against making such haste, even in a laudable enterprise, as to encourage profligacy in expenditure, and incur burdensome and obstructive obligations. If it is a matter of vital necessity for us to have the Southern Railroad, it is also a matter of vital necessity for the railways centering in this city to have it. It is the business of those corporations to extend their lines of communication, and none are more alive than they to their own interests. They can build railways at the cheapest possible rates, for it is their avocation; municipal corporations can only build them under such disadvantages that they will be costly in the extreme.

In view of all these facts, is it not best to refrain from precipitate measures, which can

not be recalled? Different and better legislation may permit us to contribute a fixed sum without incurring further obligations. The Constitution will, doubtless, when amended, contain less stringent provisions. Railway corporations may come in and even compete to take the work off our hands, allowing the people to go free of that debt which could not be otherwise than a burden upon their industry, and an obstruction to their progress.

THEO COOK,
S DAVIS, JR.,
J. J. EMERY,
Committee.

THE MINORITY REPORT.

CINCINNATI, January 6.

To the Cincinnati Chamber of Commerce:

The undersigned, the minority of the committee to whom were referred the resolutions submitted to this Chamber recommending the repeal of the Ferguson railway act, beg leave to dissent from the report of the majority of the committee, for the following reasons:

The chronic want of Cincinnati for a generation past has been a railroad connecting the Northern and Southern systems of railways, and until the passage of the Ferguson bill it was supposed that the present State Constitution forbade the city in any way providing for the great need; but this law, coupled with the recent decision of the Supreme Court affirming its constitutionality, has placed in the hands of the city ample power to accomplish that which her people, by a unanimity unexampled in municipal history, have declared to be essential to her interests.

Since the passage of the act the State of Tennessee has granted to the Trustees the right of way, and has given power to the counties and towns along the route selected to vote aid in the construction of the road. A like act is now pending in the Legislature of Kentucky, with a fair prospect of its speedy passage, and Congress has also before it upon its calendar, ready for final action, a bill granting the right of way, and authorizing the necessary bridges over the navigable streams crossing the route between Cincinnati and Chattanooga. The city, in its ordinance assenting to the vacation of Kilgour street and Eggleston avenue, did so in consideration of the Newport Bridge Company granting to the Trustees and their lessees the right to the use of the bridge and its approaches, on terms as favorable as those granted to any other railroad.

The city, through the Trustees, has also, in surveys, and profiles, maps, and other preliminary engineering (which surveys, maps and profiles, for completeness, are unsurpassed in railway history), expended upward of seventy thousand dollars. The original resolutions under consideration contemplate the abandonment of all that has been thus secured after two years of labor, and just as we are about to enter upon the actual construction of the great work which is to unite the North and South in free social and commercial intercourse, and this, too, upon the plea that there has been a great change in public sentiment in regard to the policy and necessity of the city constructing such a work—a change not evidenced. So far as the undersigned have been able to discover, except the assertion of the author of the resolutions, it is admitted by all parties that without the aid of public capital this road can not be built.

The history of railroads in this country shows that no great work like this, some 340 miles in length, has been accomplished by private capital. It was in great part by the public money of Pennsylvania and the cities of

Philadelphia, Harrisburg and Pittsburg, in the case of the Pennsylvania Central Railway, and by that of the State of Maryland and the city of Baltimore, in the case of the Baltimore & Ohio Railroad, that those great undertakings were able to overcome the mountain barrier interposing between the East and the West. And it is only by similar means that the mountain districts, and the great rivers separating the West from the South can be bridged over. Nor can it be accomplished by separate organizations for detached sections, each depending upon itself for means of prosecution. But it must be done by an organization having a grant for a continuous, connected, through line, under one ownership, and based upon a credit which can command the necessary capital without ruinous and unavoidable discounts and delays.

This organization and credit the Trustees have, and they need but the assent of Kentucky or Congress to the exercise of their powers in order to accomplish the work. In the ability and integrity of the Trustees to whom this great trust has been confided, the people of Cincinnati, the undersigned believe, have every confidence. Every citizen has an interest in its execution and the right to supervise its management.

That the statement of the preamble to the original resolutions as to the cost of the road are grossly exaggerated, the undersigned have the evidence of skilled and experienced engineers conversant with the topography of the country and the surveys of the various lines. It was expected when the act was passed that in addition to the ten millions of dollars, aid would be obtained along the route selected, and with this view power was given to the Trustees to receive donations of land, money, bonds, and other personal property, and to dispose of the same for the benefit of the fund. Nothing has since occurred to diminish this expectation, but, on the contrary, the undersigned are assured from the feeling aroused in Central Kentucky, together with the natural competition for the location of the road, that the amount of these donations will be greatly enhanced. But even if the whole burden of providing this line of railway, so necessary to the growth and commercial prosperity of the city, should be borne wholly by the city, with the resulting ownership and benefit, she would be justified in undertaking the work. Her debt is but \$5,000,000, while her property available for its payment is at least \$10,000,000.

The undersigned are satisfied that the road can be leased for a rental sufficient to pay the interest upon its cost, and to provide a sinking fund for the redemption of the bonds necessary for its construction, and we concur with the majority, that "such a work would undoubtedly be convenient and beneficial—would give a fresh impulse to the growth of the city, and be a perpetual contributor to its wealth and population."

We therefore recommend that the members of the Chamber of Commerce, on the question submitted to them: "Shall the Ferguson railway act be repealed?" unanimously vote "No."

JAMES H. LAWS,
ROBERT MITCHELL.

— The English census statistics just completed, shows for England and Wales, an area of 37,324,833 acres, 4,259,032 inhabited houses and 22,804,108 population, less than one inhabitant to every acre, and more than five inhabitants to every dwelling. The increase of population since 1851, is 2,637,884. The population of London is 3,251,804—about one-seventh of the whole.

That Report.

We give the following trite review of the report of the majority committee on Cincinnati Southern Railway, by the *Gazette* of Monday:

The majority report of the Chamber of Commerce Committee on Southern Railroad contains an embarrassment of riches in the way of reasons against allowing the Trustees to proceed. Some of these would have been more effective if others that neutralize them had been left out. It concedes the necessity of the road at the start, and denies the necessity before it gets through. It disparages the resources of the route, and denies that the road can be built for ten millions, or for any sum on which its business can pay the interest, and yet it affirms that if the city will let it alone railroad companies will build this and other roads to the South for the profit of them.

Each of these reasons would be good by itself, but together they weaken each other.

The report also specifies certain things which no rational and honest Trustees would do, but which they are not specifically forbidden to do; as if all the evil that is not prohibited they will certainly do, and therefore, they must not be allowed to do anything.

It apprehends great danger from hostile legislation by the State of Kentucky, as if the people in Kentucky would have no interest in this road through the center of their State; and for this occasion it assumes that the franchise which one Legislature may grant can not be held against any succeeding Legislature.

Because the compensation of the Trustees is left to be fixed by the court, the report assumes that it will not be governed by reason.

It objects that the Trustees are not limited in the amount of money to be expended, although they are limited to ten millions in the amount they can raise.

It is assumed that the talk of operating the road in the interest of this city means that it is to be run at a loss to the road. This seems to be in ignorance of the details of railroad freight tariffs, and of the way they are arranged to work against places, without sacrificing the profits of the roads.

It wants to know why the city does not as well go in debt to buy up all the railroads that run to this place.

It says if the Trustees can convince any body that the road can be built for ten millions, it will be built without them; but that they can't.

It declares a belief that it will cost fifteen millions, and that this will be added to our debt and taxes; and yet before it gets through it affirms that the route is so desirable in its prospects for returns that the building of it may safely be left to railroad interests.

It says there are people who want a large city debt because it is a big thing.

It says the history of municipal and public undertakings of this character is a lesson against this. Yet at the outset it said this municipal undertaking was without precedent.

The report then proposes its alternative. It starts with an application of the logical proposition which formed the rule of Sam. Patch's life, namely, "Some things can be done as well as others." It argues that if it is constitutional for the city to build the road, it is constitutional to give a bonus to somebody to build it. In short, some things are as constitutional as others.

It affirms that money to give it to other

will go so much further than money invested, that for one-third of this amount the city may have roads to Knoxville, Chattanooga and Nashville. Therefore it may either issue bonds to give away, on the Sam. Patch constitutional logic, or it may wait and see what will turn up in the new Constitution.

And then the report concludes that if we will let the thing alone, "the time is not far distant when we may have one or more roads to the South without paying anything for them." Then we shall be very foolish to pay a third of ten or fifteen millions to get them, or to try to turn the new Constitution into a general plunder law.

Lastly, the report declares the Southern Railroad of not much account, anyhow, and denies that the future of Cincinnati depends on it. Then it qualifies this by saying that "undoubtedly it would give a fresh impulse to the growth of the city, and be a perpetual contributor to its wealth and population." That would be pretty well for its future.

Then it argues that if it be a vital matter to Cincinnati to have the road, it is a vital matter to the railroads to build it.

As we have remarked, the report has a wealth of reasons. It would be much stronger with about one-third as many. But if we should accept and act upon it, would we have any tangible resource or prospect for the Southern Railroad?

Condition of the Pacific Railways.

The Secretary of the Interior, in his annual report, gives the following interesting exhibit of the affairs of the three Pacific railways:

UNION PACIFIC.

Subscriptions to capital stock ...	\$36,783,000
Subscriptions paid in.....	36,672,300
Receipts of all kinds.....	7,362,015
Cost of road, including fixtures	112,793,618
Total indebtedness.....	74,653,512
Due the United States	27,236,612

CENTRAL PACIFIC.

Subscriptions to capital stock...	\$59,644,000
Subscriptions paid up.....	54,283,190
Receipts	7,326,327
Expenses	3,745,766
Net earnings	3,580,560
Total indebtedness.....	71,430,732
Due to the United States.....	27,851,000

NORTHERN PACIFIC

Stock subscribed.....	\$100,000,000
Stock paid up	2,241,600
Expenses to June 30, 1871.....	4,936,871
Indebtedness	9,085,764

FOREIGN NARROW GAUGE RAILWAYS.—The following narrow gauge railways are in operation in foreign countries: Queensland, Australia, government railway, 222 miles; railway from Coddgeveran to Arconum, India, 19 miles; Toronto and Nipissing railway, Canada, 108 miles; government railway of Norway, 101 miles. Locomotives used: Freight engine and tender, 20 tons weight; eight wheels, six of which are coupled; passenger engines and tenders, 16 tons weight in running order, six wheels, four of which are coupled, and tank engines, about 13 tons weight, six wheels, four of which are coupled. Rolling stock: Outside width of cars vary from six feet six inches to eight feet. The speed varies from 12 to 25 miles per hour, including stoppages. Such railways in India and Norway cost from \$12,000 to \$14,000 per mile, including engines, cars and all equipments necessary.

CHURCH'S MUSICAL VISITOR.—The January number of this excellent monthly is out, with nine pages of choice new music, comprising a sparkling polka by Kinkel, "La Fidelity," a ballad, "Fairy Glen," and "Dreams of Childhood," song and chorus, by C. R. Leitch; and the usual store of reliable news and interesting matter which has already placed the *Visitor* among the first of its class. John Church & Co., publishers, Cincinnati.

DISCOVERY OF COAL IN AMERICA.—The following is a brief and reliable history of the discovery and introduction of coal in America: Bituminous coal was mined near where the city of Richmond, Virginia, now stands, as early as 1700. It was extensively used in Pennsylvania in 1775, and a Richmond foundry employed it in making shot and shell during the Revolution. It was sent to Boston, Philadelphia and New York in 1789. Obediah Gore and his brother, blacksmiths, from Connecticut, were the first to make use of anthracite coal in the Wyoming (Pa.) valley in 1768. Judge Jesse Fell, of Wilkesbarre, was the first to apply it to household uses. Philip Ginter, a hunter in the Mauch Chunk region, discovered the Lehigh coal in 1791. Mines were opened in 1793, but it was ten years later before coal was shipped to Philadelphia. The Schuylkill coal was first sent to Philadelphia in 1812.

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WRIGHTSON & CO.,

RAILROAD RECORD OFFICE

No. 167 Walnut Street, Cincinnati, Ohio.

The Railroad Record.

E. D. MANSFIELD, - - - - } Editors
T. WRIGHTSON, - - - - }
A. J. HODDER, - - - - }

CINCINNATI, THURSDAY, JANUARY 18, 1872.

The Railroad Record,

PUBLISHED EVERY THURSDAY MORNING,

By Wrightson & Co.,

OFFICE—No. 167 Walnut Street

SUBSCRIPTIONS—\$3 per annum in advance.

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The Growth of Town Population in the West, and its Influence on the Profits of Railroads.

We have recently noticed the progress of the Cincinnati & Great Northern Railroad, and the resources of the country through which it passes. This road, if made, will be, as we have described, the Cincinnati & Mackinaw road, which for several years we have earnestly advocated. It is but a few years since if that road were made it would pass through for a large part of the way, a wilderness country; now it is comparatively populous. In looking to the really profitable railroad lines of this country, it will be found that they depend not only on a rich, productive country, but on an increase of the civic or town population. For example, in New England, New York and New Jersey, the great number and populousness of towns make many local railroads profitable, when the country through which they pass produces small surpluses to make freight. In view of this fact, let us examine the increase of civic population in the central West.

We know in advance that the increase of civic population is much greater than that of rural. Where all this is to end, we know not. But certain it is the increase of town population is at double the rate of that of the rural population. Let us, in special reference to new roads in the north-west of Ohio, and in Michigan, consider, first, the increase of civic population in Ohio, Indiana and Michigan; and, second, the increase of towns within

thirty miles of the Cincinnati & Great Northern Railroad.

On the first point, we have made an elaborate investigation into the relative increase of civic and rural population in Ohio, and the result is:

	1870.
Cities and town over 1,000 each.....	142
Total population of those towns.....	810,022
Rural population.....	1,855,238
The civic population of Ohio.....	30 per ct.

	1860.
Cities and towns over 1,000 population.....	515,140
Rural population.....	1,824,371
The civic population of Ohio.....	22 per ct.

Taken in regard to the whole population, the increase of civic population, in ten years, is from 22 to 30 per cent.; that is, the ratio of increase itself increases in ten years 35 per cent. Suppose that were to continue till 1880 and there is very little doubt it will, then in 1880 the civic (town) population of Ohio will be 40 per cent. of the whole. Ohio will then contain 3,000,000 of people, and of that 1,200,000 will be in cities and towns over 1,000 each. But, taking the increase of civic population itself from 515,000 to 810,000 in ten years, the increase is greater, viz., 60 per cent. Then we say, that in accordance with the past experience of New England, New York and the eastern Atlantic States, and of Europe also, the civic population will in future grow much the fastest.

What is true of Ohio is undoubtedly true of the adjoining State of Indiana, and will be true of the whole country. This process will not reduce the amount of agricultural produce, but, on the contrary, increase it; for there will be a much greater demand and higher prices. The result must be to stimulate agricultural industry and skill. The same number of people in agriculture will produce far more food. For, 1. They will apply more capital and skill to the culture of land, in the application of manure, tillage, drainage, &c. 2. By the continual invention and application of agricultural machinery. The effect of this in the last twenty years is wonderful. It is within bounds to say that 1,000 men engaged in agriculture can now, by agricultural machinery, produce at least double what the same number would twenty years ago. The result is, that while the number of men employed in agriculture in the larger States has not increased materially, the quantity of food produced has greatly increased. The result of this again is, that not only are the populous cities and towns well fed, but the quantity exported has also immensely increased. The exports to Europe from the Atlantic cities have increased in a most extraordinary degree. But of this we shall not speak now.

We have shown above the rapid increase of civic population in Ohio and Indiana, we will now show, secondly, the increase of civic

population lying in a belt say 40 miles on each side of the Cincinnati & Great Northern road. We have taken this belt, not so much to be strictly accurate in regard to the district tributary to this road, as to show the increase of civic population, and consequently of railroad business, in that section of country.

The section of country immediately adjacent to the Cincinnati & Great Northern road shows the following facts, viz:

Number of counties.....	24
Number of cities and towns of more than 500 people.....	44
Number of people in those cities and towns in 1870.....	112,825
Number of people in the same in 1860.....	56,125
Increase in ten years.....	100 per cent.

Thus we see that the growth of civic population on the line of this road is far greater than the growth of the civic population of Ohio and Indiana, or of the whole country. In fact these are new towns in a very rich section of country. This town population not only has, but will in the future, beyond a doubt, grow much faster than the growth of the States around.

And now, the reader may ask us, what do we infer from these facts? We infer that the rapid increase of population, and of civic population particularly, on the line of the Cincinnati & Great Northern will certainly make it a very profitable road. We have shown, in previous articles and tables, that the business of railroads, and the net profits arising from that business, had increased much faster than the increase of the country. Hence, if a new railroad were begun, the probability is that if in a good section of the country, and with no more than an average competition, that road will be profitable. We now show that not only is this true of the Cincinnati & Great Northern road, but that it has peculiar advantages, and especially in this of a rapidly growing population, and a rapidly growing civic population; for it is a fact that the most profitable roads in the country are those which have large numbers of towns on them, and especially manufacturing towns, for these furnish not only passengers but a large number of packages and minor freight, which amounts in the aggregate to an immense amount. This is the great source of profit on the New England roads.

—It is said that Chicago will have used 1,000,000 tons of coal of all kinds last year, of which 350,000 tons is the Indiana block coal, which is used without coking by the rolling mills; the Danville and Vincennes road will open up these fields so that the amount used hereafter, will be greater than heretofore.

This is precisely the coal proposed to be brought here by the projected Cincinnati and Terre Haute Railroad. A full, regular and cheap supply of this coal will double our productions of iron in five years.

The Central West, and its Commercial Relations with the South and North.

I read very attentively the discussion which took place before the Board of Trade, in reference to the Southern Railroad. It seemed to me very singular; for I had supposed that the policy of Cincinnati on that subject was entirely settled. It had been before the Legislature, the people, the courts, and had passed all ordeals to which it could be subjected; when, lo! and behold, a couple of brokers and two or three lawyers discover that the business men and working men did not understand their own minds, and were not fit to take care of their own affairs! These gentlemen have a right to take what measures they please, and air their notions in any way they choose, but I submit that the manufacturers and merchants of Cincinnati are the best judges of what they need. When I see the names of gentlemen opposing the Southern road, and know their connection with business affairs, I think there is a particular cat under that particular pile of meal. Perhaps you can elucidate that matter better than I can. A hint is enough. I have no objections to that particular cat; but I have great objections to putting all the roads on the south side of Cincinnati under the control of the Pennsylvania road, as if that were in the interests of Cincinnati.

The discussion before the Board of Trade was very interesting, and I think it fortunate that it occurred, and the leading business men had an opportunity of expressing their opinion. It will decide the opinion of the public mind, so that the great work will go on.

Now I will give you a few statistics, showing the position which the Central West (whose central city is Cincinnati) bears to the other great sections, East and South. I mean by the Central West, for such it is, more particularly the five great States which make the old North-west, viz: Ohio, Indiana, Illinois, Michigan and Wisconsin. Perhaps the last ought to be omitted, and Kentucky put in. But we will take these five States as representing the Central West. Then we will take the eight States east of the Delaware as the East; and the States of Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi and Louisiana (eight), as representing the South. We will consider the growth and products of those sections, and from that deduce something of the relation they should bear to each other.

1. *Their Relative Growth.*—The five States of the old North-west have grown in population as follows:

	Increase
	per cent.
1790.....	.....
1800.....	49,605
1810.....	272,325
1820.....	792,400
1830.....	1,475,336
1840.....	2,899,883
1850.....	4,541,978
1860.....	6,901,039
1870.....	9,058,517
	31

Here is a most astonishing growth; and notwithstanding the ratio has diminished, the actual increment of growth has been greater in each decade until the last, in which it is a little less. Looking to the growth of town population, and the development of mines and manufactures, the increment of the next decade is likely to be quite as great in the next ten years.

The surface of these five States is 239,000 square miles, which is 33 to a square mile. In their order, Ohio has 67 to a square mile; Illinois, 46; Indiana, 44; Michigan, 20; and Wisconsin, 20.

Let us now take the eight Eastern States. Their growth has been:

	Increase
	per cent.
1790.....	1,481,437
1800.....	2,032,020
1810.....	2,606,495
1820.....	3,308,853
1830.....	4,144,148
1840.....	5,036,349
1850.....	6,225,065
1860.....	7,658,053
1870.....	8,775,959
	15

Thus we see that although the Central West began in 1790 with nothing, yet in eighty years thereafter these five young States had outstripped all the old Eastern States.

Now let us take the South (Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, and Louisiana). The growth of these States has been as follows:

	Increase
	per cent.
1790.....	1,473,632
1800.....	1,835,995
1810.....	2,314,578
1820.....	2,904,044
1830.....	3,744,017
1840.....	4,652,301
1850.....	5,848,748
1860.....	6,953,859
1870.....	7,367,830
	6

The growth of the South up to the period of the war was a natural growth, that is, without receiving any material immigration. This natural growth does not vary materially from 25 per cent. each decade. In 1860 the South had arrived at almost precisely the population it would have had, if 25 per cent. had been added in each decade. When the war came on, population increased very little, for obvious reasons: 1. All immigration from other States, or abroad, ceased. 2. In the South, much more than in the North, a large proportion of young men were killed or died; and 3. The negro population were uncared for and unprovided for, and therefore an extraordinary number died. The census of 1870, therefore, found the South with little more than it had in 1860.

We see, then, that the growth of the Central West was far greater than either North or South, and from the fertility of its lands and the growth of its cities this must necessarily continue. The growth of the South, now that peace and industry are resumed, will return to nearly its old ratio. Then in 1880 we shall have very nearly these results:

	Bushels.
The Central West.....	30 per cent. 12,000,000
The East.....	15 " 10,000,000
The South.....	20 " 8,800,000

The ratio of the East falls to 15 per cent., and will probably go below, because there is much more migration from than to. In the East, only the cities and towns grow.

Let us now glance at the grain producing power of these sections. We have not the agricultural statistics of 1870, but those of 1860 are near enough to show the relations of these sections as to that point. The grains, comprehend wheat, corn, barley, rye, oats, buckwheat and rice. Now, in 1860, the three sections I have named produced as follows:

The East (8 States).....	121,171,239
The South (8 States).....	232,758,336
The Central West (5 States).....	414,510,765

Here we see that the five States of the Central West raises more grain than sixteen States East and South! Nay more, these five States raise more breadstuffs than twenty States East, South and West! We can not here go into the statistics of coal, iron, copper, lead, etc., but we may here say, that we have prepared these tables with much care and labor, that they may be placed on record for future use. The conclusion and the moral of the facts is just this. This great producing and feeding country is a center, a heart from which the surpluses must go forth to other parts of the country; but from the South we are almost cut off, especially from those parts of the country which need this grain and the manufactures the most. The moral is, that breadstuffs and many kinds of manufactures are from 50 to 209 per cent. higher in South Carolina than they are in Ohio. E. D. M.

AIKEN, S. C., Jan. 10, 1872.

Increase of St. Louis Railway System in 1871.

The following, according to the St. Louis *Railway Register*, is an estimate of the number of miles of railroad, tributary to St. Louis, built in 1871:

ROADS WEST OF THE RIVER.	
Iron Mountain.....	45
Iowa Central.....	169
Atlantic & Pacific.....	73
Missouri Pacific.....	92
North Missouri.....	76
Moberly to Hannibal.....	70
Louisiana & M. R. R.....	51
M., K. & T.....	216
Atchison & Nebraska.....	49
Leavenworth, L. & G.....	37
K. C., St Joe & C. B.....	17
Atchison, Texas & S F.....	81
Midland Pacific.....	57
	1,033

ROADS EAST OF THE RIVER.	
Chicago & Alton.....	37
Quincy, Alton & St. Louis.....	40
South-eastern.....	91
	168
Total.....	1,201

Atlantic & Great Western Railroad.

LONDON AGENCY,
LONDON, December 18th, 1871.

EDITOR RAILROAD RECORD,
Cincinnati, O.

Sir:—In your number of Nov. 9th, in a notice of this railway, you introduce a reference to "Sir Morton Peto and his associates" which is as untruthful as it is unjust.

I was "associated" with Sir Morton Peto in constructing the Atlantic & Great Western Railroad. Without his aid the road could never have been built. With his assistance I found every shilling of the capital, which when it reached the United States was partly squandered and partly stolen, and had I not intervened for the protection of those on this side of the Atlantic who had invested on representations as to the prospective value of the property based on the most powerful testimonials ever brought to Europe the whole of the investment would probably have been lost. Not that the railroad did not justify all the statements in its favor. The traffic when finished even exceeded the estimates, and everything appeared to be going prosperously and promising a great success, when suddenly by the machinations of unfaithful agents, the whole undertaking was thrown into difficulties apparently insurmountable. I have however, been successful not only in constructing, but in preserving the property for its owners, and in preserving it I have preserved American credit in Europe which could not have survived, so far as industrial enterprises are concerned, such a confiscation of European capital as was threatened. The "financial embarrassments" you allude to were caused solely and wholly by the loose and ignorant administration of the company's vast resources, which were ultimately so conducted as expressly to cause embarrassment that the profits might be misappropriated. From Sir Morton Peto and his associates the Atlantic & Great Western and the district it traverses received nothing but the most powerful pecuniary support. The country benefited by ten fold the cost of the railway, which tended greatly also to the discovery of the commercial importance of the Oil Regions, and has opened out vast coal fields hitherto neglected. With all this capital and labor jeopardized it is not becoming, therefore, to state that those who ran all the risk were the cause of all the trouble, and that those who saved the property from dislocation and utter destruction were the cause of its financial embarrassments.

Why the press of America should so persistently attack Sir Morton Peto from whom Americans have never received anything but the most unrelenting courtesies and benefits, I can not understand. For forty years Sir Morton was the largest employer of labor in the world having frequently 100,000 men in the field. That he became pecuniarily em-

barrassed from any cause should have aroused the sympathy of those whom he had benefited, or if there was not courage or candor sufficient to express sympathy it would not have been difficult to remain silent in the face of the disaster.

I am, Sir, faithfully yours,
JAMES MCHENRY.

[If we have done an injustice either to Sir Morton Peto, or any of his associates, by the article in our issue of Nov. 9th, we take the greatest pleasure in correcting it.

Of the importance and value of the Atlantic & Great Western Railroad, *per se*, there can be but one opinion; and that is expressed by our correspondent. The belt of country through which it passes has undoubtedly been quadrupled in value, which would amount to many times the highest inflated cost of the road.

The advantages to this country are truly certain and permanent, they never can be effaced; and if by any efforts of ours, equally certain and permanent advantages could be secured to the projectors, completors and real owners of the Atlantic and Great Western Railroad, we should not hesitate one moment, nor even wait to be asked, before exerting ourselves to the utmost to secure so just and reasonable a result.

By a reference to the article alluded to it will be observed that we make no charges, and cast no insinuations against those who were among the unfortunates who furnished the capital to construct this magnificent enterprise; but on the contrary we then and now assert that we fully sympathize with them in the disadvantages under which they labored when they put their "money in," and which our correspondent says "was partly squandered and partly stolen."

For the services of Mr. McHenry, himself, in the conception and completion, under herculean difficulties of this great thoroughfare, the citizens along the broad belt of territory developed by it, as well as the whole American people, owe him a debt of gratitude that mere words can not express. There is no one that rejoices more than we do, in the fact that this property is again remanded to its owners, with a hope and prospect of ultimately receiving through it a recompense for their enterprise and outlay.—Ed. RECORD.]

COAL TRADE OF GREAT BRITAIN:—

In	Mined.	Exports.
1864.....	92,787,873	8,809,908
1865.....	98,150,587	9,170,477
1866.....	101,630,544	9,053,721
1867.....	104,500,480	10,415,787
1868.....	103,141,157	10,837,804
1869.....	107,427,557	10,588,425
1870.....	112,875,725	11,495,002

Increase for the year 5,348,168 tons. There was 991 deaths in and about the mines, or one for every 113,900 tons raised, the number of persons employed was 350,894.

PENNSYLVANIA COMPANY—TOLEDO CONNECTIONS.—The officers of the company have had a meeting at Toledo with the directors and representatives of the Toledo, Tiffin & Mansfield, Pere Marquette and the Toledo & Ann Arbor roads in reference to a union of these roads at that point, and to arrangements by which they shall be operated together. Arrangements have been agreed upon in pursuance of which the Flint & Pere Marquette is to construct an independent track from Monroe, Michigan, and the Toledo & Ann Arbor is to be immediately put under contract and pushed to completion. The Pennsylvania Co., according to contract with the Toledo, Tiffin & Eastern, will furnish the iron for that road from Mansfield to Toledo, and also furnish connections and bridge and depot accommodations to the Pere Marquette and Ann Arbor, which are entirely satisfactory to the interest of all.—*Chic. Ry Rev.*

An ore is found in York, Pa., which is said to be composed of quartz and mica mixed with micaceous hematite and magnetic. A process of smelting it has been adopted which prefers the use of the ore as it comes from the mine; and it is charged into the puddling furnace with the cast iron. For the improvement of iron, only ten per cent. of ore is said to be sufficient, but to produce steel in the puddling furnace from fifteen to twenty per cent. of the ore is required. The grades of foundry pig known as Nos. 2 and 3 are preferred, and the harder the iron the more ore required, and if containing sulphur and phosphorus, additional ore is used. The time required for making steel thus, is from one hour to one and three-quarters, the metal being removed as soon as it will ball, and while working being kept under the cinder as much as possible. The opposite is of course the case in making wrought iron, the molten metal being constantly turned up to the oxidizing flame, and being kept longer in the furnace. The advantages claimed are a superior article of wrought iron in the one case, and a superior steel in the other, which welds easier than other steel, and which will take a temper similar to cast.

—Rutland finds that through the lease of the Rensselaer and Saratoga Railroad by the Delaware and Hudson Canal Company, it is to become the great coal center station of Western Vermont. Coal is now brought direct in Pennsylvania without breaking bulk.

NOVA SCOTIA COAL TRADE.—The following table from the reports of the Chief Commissioner of Mines is given by *Saward's Circular*:

	Tons.
1827 to 1830.....	51,172
1831 to 1840.....	808,145
1841 to 1850.....	1,405,381
1851 to 1860.....	2,292,305
1861 to 1870.....	5,092,587

Total production.....9,649,470
Production for the year 1870, was 625,769 tons.

Nova Scotia coal was free of United States duty 1854 to 1865, and the average annual production of those twelve years was only 333,427 tons.

CHICAGO & NORTHWESTERN R.R.—GREEN BAY EXTENSION.—A correspondent of the *Green Bay Advocate* describes the trains going north as full of passengers and freight.

The new road (he says) is smooth and good, and everybody is praying for its speedy opening to Mariette and Menominee.

CINCINNATI INTERESTS.—CINCINNATI & TERRE HAUTE RAILWAY.



No railroad can be constructed to our city that is not an advantage and productive of good; those, however, that have a home here and form a part and parcel of our domestic economy, or in other words that run to and for Cincinnati instead of from and against her, are of peculiar interest to every intelligent person interested in the welfare of the city.

Of this class is the Cincinnati & Terre Haute Railway. It further possesses the peculiar advantage that while it passes through an undeveloped country, or rather is on a route unoccupied by railroads, yet it is a region unsurpassed in the fertility of its soil and richness of its agricultural resources. To this is to be added the fact that it is also a mineral region, whose inexhaustible wealth of iron and coal is the most certain and reliable source of traffic and constantly increasing revenue that ever ministered to the many rifles that go to swell the coffers of railroad corporations.

These remarks would not be true if this line of railway started in a coal and iron bank, and was merely jointed as an extra caudal appendage to some of the great trunk lines, dealing only in common traffic with the objective market a thousand miles away. But terminating as it will, in a market that can not be surfeited with the minerals peculiar to it, and which must constitute a large portion of its traffic, and these articles practically inexhaustible, it can not be otherwise than a remunerative line.

But, it may be argued no railroad can compete with the river in the transportation of

coal. That is an error. Let us look at it for a moment. What is the price of coal to-day in the Cincinnati market? Fifteen cents per bushel in the barge! Youghiogheny is scarcely ever sold below 12 cents in the barge, it has sometimes touched 10½ but not often since the war.

Now what can coal be delivered in the yards by rail for? It costs three cents per bushel to mine coal, allow half a cent to the owner of the mine as royalty, and then you have the haulage by rail over one hundred and forty-three miles of railroad worth one cent and one-quarter per ton per mile, or one dollar and seventy-nine cents as the charge for carrying the ton of coal to the Cincinnati market, this is six and a half cents per bushel, making the total cost in the yard of the dealer *ten cents per bushel*.

To secure this result in a transaction in Pittsburg coal, it will have to be sold in the barge at the river at *eight cents*! How soon may we expect this while we remain under the jurisdiction of the Pittsburg syndicate, we leave to be answered by the tribute payers of Cincinnati.

Of the merits of this project the *Official Railway Guide* says:

Among the numerous railroad projects now being brought before the public none is, perhaps, entitled to greater patronage than that which is proposed to be built between Cincinnati and Terre Haute, and which opens up to a constant market the almost inexhaustible coal deposits of Central Indiana. The originators of this important enterprise are evidently practical in their ideas, and recognize the

fact, that no road should be constructed for through business alone, but that it should traverse a section of country from which, in all human probability, the local traffic should be amply sufficient to pay interest upon the cost of construction. So many chimerical projects have been advertised, and so many visionary theories, as to prospective earnings and resources of new railroads, have been paraded before the public, that it is refreshing to read a plain and unvarnished prospectus, such as that issued by the president and directors of this company; and, it is instructive to learn from the report of Mr. McDowell, chief engineer, how, by a safe investment, the latent mineral resources of a Western State can be rapidly developed, and the aggregate wealth of our common country materially augmented.

The Cincinnati & Terre Haute Railway Company was organized during the past year under the general railroad law of the State of Indiana, with a capital stock of four millions, and is intended to pass from the city of Terre Haute, through the counties of Vigo, Clay, Owen, Monroe, Brown, Bartholomew, Decatur, Franklin, Ripley and Dearborn, to the eastern boundary of the State of Indiana, and thence through Hamilton county, in the State of Ohio, to Cincinnati. The distance between the termini will, according to the survey, be one hundred and eighty (180) miles; and a branch will be constructed from Bloomington to the Wabash river, sixty-two (62) miles in length, for the purpose of connecting with the St. Louis & Cincinnati Railway, and establishing a line between St. Louis and Cincinnati, the two great commercial centers of the West, twelve miles shorter than the existing short route, via the Ohio & Mississippi Railway, and twenty-five miles shorter than that via Indianapolis. It is also proposed to construct fifty-seven (57) miles of lateral branches, so as to secure the traffic of extensive coal and iron deposits, lying some distance from the

main line; and this company will eventually control two hundred and ninety-nine miles of road. Subscriptions to the amount of \$385,000 have already been voted by several towns and counties along the line; and as but few of the twelve counties through which the road passes have yet been canvassed for subscriptions, the managers believe, that in estimating the available means to be derived from this source alone at one and a half millions of dollars, they do not overstep the bounds of probability. Individual subscriptions, to the amount of \$285,500, have also been made; and appropriate steps have been taken for bringing the importance of this enterprise prominently before the business capitalists of Terre Haute and Cincinnati. To ensure, however, sufficient capital for the prompt and expeditious prosecution of the work, the board of directors, acting by authority of a resolution of the stockholders, have issued a mortgage or deed of trust to the New York State Loan and Trust Company, of the city of New York, as trustees, conveying all the real and personal property of the company, whether now owned, or to be hereafter acquired, and including valuable mineral privileges, to secure the payment of the principal and interest in gold of six million dollars of bonds, bearing seven per cent. interest in gold, payable semi-annually, at the city of New York, or at the option of the holder, in sterling, in the city of London. We predict, that these bonds, when placed upon the market, will meet with a ready sale, and be eagerly sought after by investors—partly on account of the social and commercial standing of those who are managers of the road, and partly from the undoubted security which is offered to investors under the deed of trust. It may be noted here, prior to reviewing the chief engineer's report, published in connection with the prospectus of the company, that the entire line has been placed under contract, upon terms which insure its completion and equipment at a cost which will not exceed \$35,000 per mile; and as ground has been already broken on the divisions extending west from Greensburg, it is expected that through communication with Cincinnati will be established within one year from date, or in January, 1873. Mr. McDowell's report treats, in an able manner, of the necessity which exists for the new line, and demonstrates very clearly that the section of country possesses within itself all the elements for the building and sustaining of a first class railway. Premising that Cincinnati is the distributing point for a large area of country, and that Terre Haute, the fourth city in Indiana, is the geographical center of an extensive trade in Illinois and Indiana, Mr. McDowell shows that the new road will pass through a section which is but indifferently supplied with railways. On the south, the Ohio & Mississippi Railway is distant about forty miles, and the same distance exists on the north, between the Cincinnati & Terre Haute, and Terre Haute & Indianapolis, or Indianapolis, Cincinnati & Lafayette Railroads, except where the competing lines will converge in approaching Cincinnati. From Terre Haute eastward, for forty miles, to near Spencer, the county seat of Owen county, the route lies through the productive coal measures, and thence over limestones and sandstones of an older date; the surface of the country is rolling, and the soil specially adapted to the cultivation of wheat and corn; while among the various classes of timber with which the route is well stocked, a large amount of black walnut, so much in demand for furniture, is everywhere found. The coal measures alluded to above resemble, in many

of their characteristics, the Welsh coal, which produces such a superior quality of iron; and while the block coal mined in the vicinity of Brazil, and in the western part of Owen county, through which this road will run, is highly prized as ordinary fuel for locomotives and for ocean navigation, it is invaluable for iron smelting, and pig iron made with it is equal in every respect to charcoal iron made from the same ores. "It is," to use Professor Cox's words, "a soft, gray iron of a highly crystalline structure, and contains a large percentage of combined carbon, with but a mere trace of sulphur and phosphorus, properties which render it admirably adapted to the manufacture of Bessemer steel." This statement is confirmed by the experience of Mr. Roberts, superintendent of the Union Rolling Mill, at Chicago, who says that he has worked in a rolling mill in England, in Troy, N. Y., and in Cleveland, but that he has met with no coal equal to the Indiana block coal for making rails. In the blast furnace, where the hematite ores of Missouri and Lake Superior are used, it makes a pig iron which is equal in every respect to the charcoal iron made from the same ores, and is just the quality required for making Bessemer steel. Allusion is made here to the valuable character of this coal, from the fact that the seam appears to attain to the greatest thickness where the line of the Cincinnati & Terre Haute Railway passes through Owen county; and explorations justify the assertion, that for several miles it extends to a much greater depth than at Brazil, where it has hitherto been principally mined, and where the number of furnaces erected during the past few years testifies, in the most unmistakable manner, to its superior quality as an iron producing coal. The experience of Brazil would justify us in stating, that the prognostications of Mr. McDowell relative to the future construction of furnaces, rolling mills, &c., in connection with this valuable mineral deposit, are not chimerical. We remember the time, in 1866, when Brazil was, comparatively speaking, an insignificant station on the Terre Haute & Indianapolis Railway. In 1867, the first furnace was erected, and a single shaft supplied all the coal. Now, what do we find? Six furnaces turning out a daily product of 126 tons of pig iron, and all using the block coal, in a crude state; then, there was but one shaft; now, there are twenty mines opened in the block coal seam, turning out 3565 tons daily, and giving employment to more than 800 men. In this vicinity alone, the daily capacity of the mines is 8,645 tons; and, while the demand is unlimited, the railway companies can not furnish adequate facilities for transporting the products of the mines. With these facts before us, who can say but that, within five years or less from this time, a similar condition of affairs may exist on the Cincinnati & Terre Haute Railway, and that the question may not be one of production, but of the capacity to haul such production to a market. There are also wise provisions in the economy of nature, one of which, as demonstrated by geographical researches, is, that iron is generally, or rather frequently, found in contiguity to coal; and the State of Indiana furnishes no exception to this rule. Near the eastern limits of the coal measures there are valuable beds of iron, in the form of banded ore and kidney ore. These ores will probably give in the furnace thirty-three per cent. of metallic ore, while the earthy matters, carbonate of lime and alumina, would form an excellent flux, when mixed with the rich specular ores, and correct the "red shortness" which appertains to the iron produced from these ores. Our readers, however,

must bear in mind that each succeeding year demonstrates the superiority of steel over iron, for general railroad purposes; and the problem for solution now is, what section of country can produce the best quality of steel at the lowest price, and circumstances, from present indications, favor Indiana as the prospective center of steel manufacture. With her inexhaustible deposits of block coal, with facilities for transporting to her furnaces the specular ores of Lake Superior and Missouri, at a much lower rate than can be obtained by the rival States of Ohio and Pennsylvania, she occupies an advantageous position which will be materially strengthened by railroad development and the prudent investment of capital. An abundant market, also, exists at Cincinnati, Chicago, Louisville and Evansville, for the product of these mines which is not consumed in the manufacture of iron. The recent coal famine at Cincinnati, incident to a low stage of water in the Ohio, has demonstrated the necessity of its not being dependent on water transportation, always precarious and becoming more so each year, as the country is cleared up and drained for a supply of fuel. From July to November, there is a compulsory suspension of the navigation for coal barges; from that time until January, there is high water; and again, from February to May—hence, it is only during the spring and fall that the river towns and the lower markets can obtain their supply of coal; and if the expected rise of the river in the fall is delayed, coal becomes scarce and prices exorbitant, as evidenced by the fact that during the past autumn, in consequence of these extraordinary causes, the price of coal rose at Louisville to thirty-four, and at Cincinnati to thirty-six cents per bushel. This contingency can be obviated by the construction of the Cincinnati & Terre Haute Railway; and, as the distance from the proposed mining seats to Evansville, where coal can at all times be loaded in barges and shipped to southern markets, is only ninety three miles—to Louisville 110 miles, and to Cincinnati 143 miles—it is confidently believed that, in these markets, with this route opened, the Indiana coal can successfully compete with that of Pittsburgh, without reference to any artificial scarcity.

In commenting upon the engineering features of this work, Mr. McDowell states that the relief and depression of the country is not so great as to present any formidable impediments in the construction of a railway; and only three considerable streams require to be bridged, the whole of which will be less than 2,000 feet. As to gradients, alignment, and cost of construction, the projected route will compare favorably with any railway in the State.

These brief remarks, relative to the present condition and future prospects of a new road, will, it is hoped, attract the attention of our numerous readers to the State of Indiana, and its vast mineral resources; they will thus be enabled to picture, in their own mind, the growth of their country as a great commercial and manufacturing power, when, as in the present instance, its deposits of mineral wealth are developed by the prescience and energy of gentlemen similar in ability and character to those associated with this enterprise.

The executive officers of this company are as follows:

Gen. Alfred Pleasanton, President; C. F. Betts, Secretary, New York; John D. Scully, Treasurer, Pittsburgh; N. M. McDowell, Chief Engineer, Bloomington, Ind.; Mat. P. Wood, Gen. Supt., Terre Haute, Ind. General offices, 98 Broadway, New York.

J. W. Sweeney, Soliciting Agent, 36 West Fourth street, Cincinnati.

St. Louis Rail Freightage.

The following tabular statement, from the St. Louis *Railway Register*, shows the gross amount of freight brought to and carried from St. Louis in 1871, and the increase thereof, as compared with the preceding year :

ROADS EAST OF THE RIVER.

	lbs Received.	lbs Shipped.
North Missouri	214,583,432	409,919,149
Iron Mountain.....	586,349,903	296,537,491
Missouri Pacific	535,885,149	429,028,035
Atlantic & Pacific.....	378,466,000	135,658,000
Total lbs.....	1,715,284,484	1,271,142,665
Total tons ...	857,642	635,571

ROADS EAST OF THE RIVER.

	Received.	Shipped.
Rock'd & R. Isl'd.....	121,662,000	19,730,000
South-eastern	127,288,272	47,077,795
Chicago & Alton.....	435,173,939	166,733,838
Ind'ps & St. Louis.....	227,552,982	216,168,014
Ohio & Mississippi.....	620,072,000	243,478,000
St. L. Van. & T. H.....	232,734,000	123,058,000
Toledo & Wabash.....	164,180,000	98,918,000
Belleville & S. Ill's	84,619,349	55,358,985
Illinois & St. Louis.....	228,774,000	5,062,000
	2,242,056,592	1,020,783,632

RECAPITULATION.

Total tons received from West	857,642
Total tons shipped West	635,571
Total tons received from East	510,392
Total tons shipped East	1,121,028
Total rail tonnage of year	3,124,633
Total rail tonnage of 1870	2,379,206
Increase 1871, tons	745,427

Railways of Minnesota.

The following table very clearly exhibits the progress of the great civilizers and subduers of the wilderness in the young giant of the North-west, destined before long to rank among, if not the first of the food producing States of the Union :

	Built before 1871.....	Built during 1871.....	Total Jan. 1, 1872.....
Northern Pacific.....	50	178	228
St. Paul & Pacific (main line)	135	72	207
St. Paul & Pacific (branch)		76	76
St. Paul & Sioux City.....	122		122
Sioux City & St. Paul.....		56	56
Hastings & Decatur	28	20	48
Lake Superior & Miss.....	155		155
Minneapolis & Duluth.....	12	12	24
Minneapolis & St. Louis.....	28	28	56
Stillwater & White Bear...	13	13	26
Chicago & St. Paul.....	55	46	101
St. Paul, Stillwater & Taylor's Falls.....		24	24
Winona & St. Peter	139	25½	164½
Milwaukee & St. Paul.....	146		146
Southern Minnesota	76		76
Total	1089	461½	1550½

The Probable Exhaustion of Bessemer Pig Iron in England.

It appears that our manufacturers of Bessemer steel can thus far not well do without a peculiar kind of English pig iron, which, by its freedom from phosphorus, is especially adapted for their purpose. It is well known that a quarter of one per cent. of this material makes pig iron unfit for the Bessemer process. All that our metallurgical chemists have thus far been able to accomplish is to reduce the use of the imported iron to a minimum, in which direction Professor Maynard, late of the Rensselaer Polytechnic Institute at Troy, has been eminently successful.

In the meantime the West is looking up, and in Indiana pig irons are produced from the Missouri ores, by the use of Indiana block coal, which are claimed to be equal in quality to the English iron referred to above, but which, it appears, can not well compete with the English product in regard to cost. Recently, however, we hear from England that the fear is expressed there that, as the demand for this particular pig iron is increasing so rapidly, the ores from which it is obtained will soon give out. That this is more than a mere assertion made for the purpose of driving up the prices is sure, from the fact that this pig iron is only obtained from the red hematite found in the carboniferous limestone in two localities, near Ulverston in Lancashire, and near Whitehaven in Cumberland. We see now that the question has attracted the attention of the Iron and Steel Institute in England, and they have appointed a committee of experts to report on the distribution of the English iron ores, especially referring to the deposits of red hematite, and this committee has now presented a preliminary report confirming the fear. Consequently, application has been made to the Director General of the Geological Survey, requesting that the officers under him should be instructed to report on the existence of other deposits, if such may have come to their knowledge. This, however, was either refused, or the knowledge did not exist; at least no favorable information has been gained in this direction. If, then, by these facts, the prices of this ore and of the pig iron made from it are going to be raised in Great Britain, the Indiana Bessemer pig may be not only able to compete with the English, but those interested may earn great profits, and the proposed plan to erect Bessemer works in Brazil, Indiana, or in that neighborhood, will be stimulated by this fact, as well as by the well founded and highly favorable reputation of those concerned in such an important enterprise.

We need not say that iron rails should be used no longer, but that the example of those railroad corporations who recently have been relaying all their tracks with Bessemer steel rails should be universally followed.—*Cor. Engineering and Mining Journal*.

Of the durability of timber in a wet state, the piles of the bridge built by the Emperor Trajan across the Danube are an example. One of these piles was taken up, and found to be petrified to the depth of three-fourths of an inch; but the rest of the wood was little different from its ordinary state, though it had been driven more than sixteen centuries. The piles under the piers of old London bridge have been driven about 600 years, and, in 1746, it did not appear that they were materially decayed; indeed they were found to be sufficiently sound to support the masonry superstructure. They were chiefly of elm.

Journal of Railroad Law.

Railroad Companies and their employees—Liabilities and duties inter sese.

A railroad employee having knowledge of the unfitness of another employee of the same company, or one whose position and duties are such that he ought to be acquainted with his unfitness, when it has become notorious, and who does not give information to the company of the unfitness thus actually or constructively known to him, takes upon himself all the risks of injury from such unfitness, while engaged in the ordinary performance of his duties, as much as if he had expressly contracted with reference to possible injuries from that cause.—[*Davies vs. Det. & Mil. R. R. Co.*, 20 Mich. 105.]

Where the reasons which are relied upon to charge the officers of the company with knowledge apply with equal force to show the knowledge of plaintiffs, the negligence of the latter in not complaining is as great as that of the company in employing an incompetent person; and where employer and employee have equal knowledge, and the latter continues the service, each party takes the risk, unless the employer undertakes to give special directions. A direction by a railroad officer to his subordinate, to perform an ordinary service, such as his employment contemplated—there being nothing unusual in the mode directed—is not such a special direction as will charge the company for an injury happening during the performance of such service.—[*Ibid*.]

It is a neglect of duty in a railroad employee not to give notice to the proper officers of the company, of any fact affecting the performance of the duties of the company to the public, occurring within the department under his supervision.—[*Ibid*.]

DAYTON & UNION R. R.—The following are the members declared elected :

H. C. Stimson and Mr. Pennington, of New York; John H. Achey, George W. Rogers, John Howard, James McDaniel, and W. L. Darrow, of Dayton; J. Riley Knox and David Studybaker, of Greenville.

The ticket supported by the Cincinnati, Hamilton & Dayton company was, D. McLaren, F. H. Short, and Messrs. West, Fletcher, Huntington and Goodman of the present C., H. & D. board of directors, together with Stanley Matthews, and Col. I. P. Gray, of Union City, Ind.

After the election, the Board organized by electing H. C. Stimson, President; James McDaniel, Vice President; J. Riley Knox, Secretary; John H. Achey, Treasurer; Wm. Bomberger, Auditor.

Mr. H. L. Pope was subsequently elected Superintendent, in place of S. R. Stimson resigned.

—The price of rails is now fifty per cent. less than when England had the monopoly of the trade in this country, showing clearly what protection has done for the consumer. England is compelled to sell at the prices fixed by American manufacturers, but without protection this manufacture could not have been engaged in, and the price would still have been at the maximum. Protection, competition and skill, are bringing our greatest commodities to the minimum rate as rapidly as possible.

Commerce of Russia.

We gather some idea of the commerce of Russia from a volume of statistics just published by the Russian Minister of Finance. In 1870 the exportations were of the value of nearly 352,000,000 of roubles, while the imports were only to the extent of 315,000,000. In 1869 the exports were 257,000,000, while the imports reached 324,000,000. Thus the value of exports increased in 1870 by 37 per cent. over 1869, in which year the increase was 75 per cent. over 1866, and 100 per cent. above 1866. Among the articles of exportation, wheat not only occupies the first place, but the trade in it had increased to an unprecedented extent. The value of wheat sent abroad in 1870 was 163,000,000 of roubles, while in 1867, a year of scarcity in Europe, the value of the export of that article did not exceed 94,000,000. In 1863, the least favorable year, the amount was only 44,000,000. After wheat, the chief exports are linseed and flax, which represented last year a value of 84,000,000. In 1870 the export of flax was much greater than in 1869, but in linseed there was a slight decrease. Last year flax of the value of 57,000,000 was exported, against 33,000,000 in 1869. Timber comes next, of which in 1870 13,000,000 of roubles in value was exported, against 11,000,000 in 1869. Next come hemp, bristle, cattle and hides. On the other hand, there has been a decline in the exports of some articles, such as tallow, sheepskins and linseed oil. In 1870 the imports, particularly of cotton, of metal wares, colonial products, fruits and other articles of food, fell off. Against that must be set an increase in the importation of machinery. The ports of the Baltic and the Black sea have had the greatest share of the exports, but the imports of foreign goods have been chiefly through the Baltic ports and the Western frontier. The arrivals of shipping were greater in 1870, as compared with the previous year, by 1,865, and the departures increased 1,747. The countries which took the greater portion of Russian exports are: Great Britain, 170,000,000 of roubles; Prussia, 68,000,000; France, 34,000,000; Austria, 14,000,000; Turkey, 10,000,000; Holland, 8,000,000; Belgium, 7,000,000; Germany, other than Prussia, 6,000,000; Sweden and Norway, 4,000,000. As concerns imports, Prussia occupies the first place, having contributed in 1870 goods valued at 126,000,000 of roubles; Great Britain figures for 117,000,000; France, 19,000,000; Austria, 10,000,000; the Hanse Towns, 9,000,000; Turkey, nearly 9,000,000; Italy, 7,000,000; Belgium, 6,000,000; and the United States, 5,000,000. The customs revenue has increased to upwards of 40,000,000 of roubles, being 1,500,000 above the receipts of 1869, and 4,000,000 in excess of those of 1868, which was the last year during which the old customs tariff was in force. In 1860 the customs revenue was only 28,000,000 of roubles. Russian commerce thus appears to be in a flourishing condition.

— The work on the St. Louis & Southern Railroad will be commenced immediately after the first of January. The company are now making arrangements with responsible contracting parties, who expect to have the road ready for the iron from Seneca, Missouri, to Baxter Springs, Kansas, within the next sixty days, completing the first division. This is an important road for St. Louis, connecting our city via Atlantic & Pacific Railroad with Baxter Springs and all Southern Kansas.—*St. Louis Railway Reg.*

IMPROVEMENTS IN MAKING STEEL.—Improvements in the manufacture of steel are constantly making in Great Britain, where its use has been extended more rapidly than in the United States. It is but a short time since manufacturers were unable to guarantee steel plate of greater thickness than one-fourth of an inch; but good plate can now be obtained of any thickness that can ordinarily be used in boiler making or ship building, and a steel containing from 0.3 to 0.5 per cent. of carbon is probably before many years destined to supersede wrought iron almost entirely. Such a steel has all the ductility and malleability of wrought iron, combined with very much higher absolute tenacity and resistance. Its introduction, therefore, renders many constructions practicable that were quite otherwise with wrought iron. It is asserted that one cause of the success of British steel makers, according to the Bessemer plan, is the invariable employment of a professional chemist at the works, who analyses carefully all stock received, and all grades of product. Frequently he makes a set of analyses of metals at various stages of manufacture, and thus keeps a useful check upon all employees, from purchasing agents to the workmen in the rolling mill. A chemical test thus conducted determines the value of all materials, before use or purchase, and equally well as to whether a cracked rail is faulty in the character of the metal, or from carelessness at the rolls.

— The St. Louis & Cincinnati Railway Company, capital stock four millions of dollars, have filed articles of association in the office of the Secretary of State of Illinois. It is proposed to construct a road from a point opposite St. Louis to the eastern line of Illinois, near the town of Merom, county of Sullivan, State of Indiana, so as to connect with the branch road of the Cincinnati & Terre Haute Railroad, which is authorized to be constructed under the general laws of the State of Indiana, from a point at or near Bloomington, Ind., to the Wabash river. The road is intended to run in a direction a little north of east, through a part, if not all of the following named counties in the State of Illinois, viz: St. Clair, Madison, Clinton, Bond, Fayette, Marion, Effingham, Clay, Jasper, and Crawford. The length of this road will be about 150 miles.—*St. Louis Railway Reg.*

OIL WORKS IN RUSSIA.—At Riazan, a large city 150 miles to the south-east of Moscow, Russia, extensive works for raising and refining petroleum are now in course of erection, for which the necessary machinery is being constructed in England. The coal mines at Kharloff and in the neighborhood of Taganrog are known to lead to deposits of enormous extent, and it is believed that the supply of oil from these mines will be practically inexhaustible.

INEXTINGUISHABLE LAMP.—A new light, which seems fitted to be of use in submarine construction of works, is in use in England. It is a cylinder of tin, with a top filled with a phosphide of calcium, prepared by the inventor, a Mr. Hulmes. When the lamp is thrown into the sea or river, the water, entering the cylinder, decomposes the phosphide of calcium, phosphuretted hydrogen results; the latter escaping in great quantities ignites spontaneously, and burns with a brilliant light.

PROPOSED NEW RAILROAD ROUTE.—The Quincy *Whig* advocates a river line of railroads between the Upper and Lower Mississippi, and proposes the following route:

Roads.	Miles.
St. Paul to Burlington	265
Quincy, Carthage & Burlington Railroad, Burlington to Quincy	72
Quincy, Alton & St. Louis Railroad, Quincy to Louisiana, Mo.	40
Louisiana, Mo., to St. Louis, by a line yet to be built (say)	80
Total	547

Here is a line extending from St. Paul to St. Louis, a distance of less than 550 miles. This is emphatically a river route, touching the main river cities on its course, and this, we have reason to believe, will eventually be the great route between the Upper and Lower Mississippi.—*St. Louis Railway Reg.*

— In New Haven, Conn., there is a needle factory where the whole process is done by a single machine without the labor of any person. It cuts the pieces of steel wire consecutively, punches the eyeholes, countersinks the eyes and grinds the points, and, in fact, does everything until the needles drop out completely formed.

— The use of peat for fuel at the Ishpeming blast furnace is pronounced a success. The peat is prepared by being dried, baked and coked, converted in short into a charcoal.

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The Railroad Record.

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Cincinnati Interests in the South.

Notwithstanding the Southern road, and the relations of Cincinnati with the South, have been discussed so long and so much, I can not help adding a little more on that subject. Every little thing I hear and see in South Carolina and Augusta, goes directly to the same point, that neither Cincinnati or the South fully understand what immense advantage both would receive from a direct railroad under the control of Cincinnati itself; for, mind, that is an all important point. Now, let us go to a store in Aiken, Augusta, or any other point in this region, what would you hear about the purchase of goods, or intercourse with other people? You would hear of Charleston, New York, Philadelphia and St. Louis. Charleston, the main point of delivery to the interior, means simply New York, or Boston; Philadelphia means whatever can be brought by what is called the great Southern route; but why St. Louis? Because St. Louis can get here by the Memphis & Charleston road just as cheaply as you can, and perhaps more so. Papers and letters take three days to get here from Cincinnati. Look through the stores to see what comes from Cincinnati, and what do you find? Yesterday I saw the first article advertised from Cincinnati. That was lager beer! Fresh lager from Cincinnati was advertised. Lager beer from Cincinnati has a high reputation, but I don't think the trade in lager will supply the place of all other trade. Now listen to the people, and see what they say of Cincinnati. Nothing

unless you let them know something of it. The truth is this region is entirely cut off from anything beyond the Ohio. It is an unknown region to them, except that they have heard Ohio is a rich State, and Cincinnati kills pigs. How can they? Where does the merchant get his goods? New York. Where does he get his flour? St. Louis. Where does he go to reach the north bank of the Ohio? Louisville. Who comes to Aiken for health? Nearly all from New York and Philadelphia, with their surroundings. Now, this is not so because the people want it. On the contrary the people will rejoice in any means by which they can get their food and goods cheaper, and which will open up a better and wider intercourse with the outside world. Europe has now no trade with Central Arabia, and everything there is singular, comparatively barren, and almost barbarous. But the Arabians are a quick, intelligent people, wanting whatever they can get of civilized products. Now, suppose there was a direct line of railroad run from Paris, or Vienna, into the heart of Arabia, would not the result be immediate and almost revolutionary? The culture of coffee and other Arabian products would be stimulated to tenfold its present results, for Arabian coffee is the best. European manufactures of all kinds would be sent there to an hundred fold the present export, yea, a thousand fold. The intercourse of the people would produce great changes; and in one word, would be a great step in human progress. I don't say that there is any exact parallel between such a work, if it could be made, and a direct railroad from Cincinnati to Charleston, but I do say, that it is a parallel in this, that the Southern Railroad from Cincinnati would work a great revolution in the intercourse of the two sections, and a great advancement in the progress and comfort of this section, and in its productiveness. Three results would follow: 1. A great increase of trade to Cincinnati, especially in manufactured articles and provisions. More than half, nay three-fourths, of the trade of the South Atlantic with New York and Boston would go to Cincinnati. 2. An increased activity in the production of those articles which are peculiar to the South. That again would increase the trade with Cincinnati. It must be remembered in regard to this, that this whole Southern country is slow. No doubt this was a natural result of depending upon the negro for labor. The Southern mind is (except in politics, in which its educated men so largely engaged) sluggish. It is slow to perceive the value of machinery. It is slow to put a machine in motion. It is slow to engage in new enterprises. But quick and constant intercourse with Cincinnati and the Central West would waken it up. There would be an advance in the arts and culture; and with that an advance in population. Why should not the cotton crop be doubled? Cotton can be raised profitably at 6 cents per pound, but the

price now is nearly three times that. Why? Because of the constant and pressing demand for cotton in manufactures. So of other articles.

3. A third result would be moral and social. The people of the South are almost exactly like the people in the North. Why should they not be? But they were very differently situated. Made sluggish in arts and industry by the negro system, they were also brought up to dread and dislike those who opposed that system, and that was the great body of the people in the North; but that is all over, and passed away, I trust, forever. The bitter feelings of the war have almost wholly passed away, indeed to a far greater extent than could at first have been believed. Now, let Georgia, South and North Carolina, be as closely connected with Cincinnati as New York and Pennsylvania are, and you will have a wonderful revolution in the social relations of the people. I have written a good deal on this subject for the RECORD, but there is no part in this whole discussion which interests me more than this. I want the Southern people to be placed in the relations to the West which is so plainly natural, and which is so important to the common welfare of our country.

Now, there is another point which is all important, that by this Southern Railroad you should also give life to these Southern railroads. At present, they have scarcely any life. Why, if you should tell an Ohio, Pennsylvania or New York man of 17 miles an hour as the maximum of an express train, he would laugh at you; and yet that is the maximum on these Southern roads. Now, if that is to be continued, the Southern Railroad will not accomplish half its purpose.

Now let me turn your attention to the actual fact. Let us contrast what is with what may be. From Cincinnati to Augusta now 752 miles, 50 hours. The survey to Chattanooga saves, according to the engineer, 120 miles. We have then 630 miles to Augusta. Let us now suppose the whole line run at an average of 30 miles an hour, the result will be 31 hours from Cincinnati to Augusta; and with that reduction of time will come also a reduction of cost. The railroads of the South now charge 40 per cent. more than they do at the North. The moment the direct road, running at 30 miles an hour, is made, the charges will come down to the proper limit. I paid \$35 for a ticket from Cincinnati to Augusta; with the Cincinnati Southern Railroad it will be only \$20. With that will come a great commercial and social change. E. D. M. Aiken, S. C., Jan. 18, 1872.

The quantity of salt from the Onondaga (N. Y.) Salt Springs inspected during the last fiscal year, was 8,579,193 bushels. This shows a decrease of production, compared with the previous year, of 271,054 bushels. The net revenue to the State has been \$26,656 79, which is \$7,254 28 less than that of the previous year.

Another Railroad Bridge across the Ohio at Cincinnati.

The telegraph brings us intelligence this week that a resolution has been presented to Congress, asking permission to construct another railroad bridge across the Ohio river at this city. The resolution was offered in the House by Gen. Banks, and referred to the proper committee.

We are at a loss to know at whose instance this movement is made. It has certainly been prompted by one or more of the railway companies centering in this city. Nothing in the information received indicates the locality of this contemplated structure, and we are left to conjecture this as well as the particular interests it is intended to serve.

For many years we were without this means of connection with the railroad system of the South, and now that the first attempt of the kind is almost completed, others are likely to be made. "Blessings never come singly," and we suppose we shall from time to time be startled with new bridge projects until the demand for such structures is supplied, and the Ohio river will be spanned by at least three such vast roadways.

That the present bridge is inadequate to the wants of the railways seeking this city is already evident. Being in the hands of a great corporation, whose interests are more or less antagonistic to those of other companies, and indeed whose own business may be equal to the capacity of this riverway, is enough to induce any other corporation, or a combination of such corporations, to look out for another bridge over the river, if they desire, as we understand they do, connection with the railroad interests of the two sections of the country.

It is only lately that such a connection was deemed necessary, and that our city was selected as one of the important crossing points. It is the spreading out system of railways that has brought this about. Of this policy the Pennsylvania Central is the especial champion, and has inspired the tremendous efforts that are now being made by its rival companies to secure a share of the extensive and growing business of the South-west.

There are upon this side of the river, centering at this city, three completed roads, and two more that will undoubtedly be made, whose interests will be most favorably affected by crossing the river and extending their lines southward. And upon the other side, the Lexington road has long suffered for that direct connection with the city and northern roads that a favorably located bridge would give it; and our great contemplated Southern road, and at least one other, will be lessened materially in importance and profit, either to this city or themselves, unless they can find their northerly terminus here, and exchange business with northern lines.

It is not possible, we suppose, to construct a bridge across the river so as to accommo-

date all these roads, nor do we suppose that two bridges, one besides that now nearly completed, will be adequate to the business that these great lines will in a few years bring to them. Three or more such structures therefore becomes necessary, and will in a few years undoubtedly be made.

It is conceded, we believe, even by those who are constructing the present bridge, that its location is not the best possible for such roads as may find the east end of the city, whilst for those at the west end it is practically out of reach. It is likely, therefore, that another bridge may be built in the east end, and when the necessities are great, and the roads concentrating in the west end are rich and powerful and will combine, they will be willing to encounter the great natural obstacles to be surmounted in erecting a suitable structure over the river at that end of our city. It will require an immense outlay of money and considerable engineering skill, but the time will come when such an enterprise will be profitable, and then it will be undertaken and accomplished.

Whether the necessity for either of these new structures exists at present, we are unable to say. We are inclined to think not, however. The northern roads are not yet finished, the combinations they will make are hardly foreshadowed, long as they have been talked about. Nor are the roads upon the south side of the river, so far advanced as to evince their strength or claim their connections. They are all in certain stages of progress, and will within a few years conclude their relations, and gather the strength requisite for the further movements of which we have spoken. It is not even well settled yet what lines shall pass into the east and what ones into the west end of the city, or whether several of them may not become identified with both extremes. There are various theories upon this subject, and some of our most sagacious railroad men have already given their views upon it, and marked out the routes, leaving the future to determine whether they judged wisely or not.

The movement of Gen. Banks in Congress may consequently be in the interest of some of these keen foresighted men or far reaching corporations. They may be anticipating the inevitable, and taking time by the forelock.

— The necessary papers for the reorganization of the North Missouri Railroad Company, under the general railroad law of the State, have been forwarded to Jefferson city for filing in the office of the Secretary of State. The following constitute the board of directors: T. Blackstone, President of the Alton and Chicago road; John J. Mitchell, Director of the Alton and Chicago road; Thomas A. Scott, Vice President of the Pennsylvania Central; J. N. McCullough, Superintendent of the Pan Handle, Pittsburg, Fort Wayne and Chicago; Adolphus Mier, Vice President Kansas Pacific; Solon Humphrey and J. A. Jamison, New York; James H. Britton, James B. Eads and William M. McPherson, St. Louis. Mr. Blackstone will probably be chosen President.

Virginia & Kentucky Railroad.

We are pleased to learn that this important work is likely to be pushed forward the coming season with great energy. There are now two surveying corps in the field under directions to conclude their work as rapidly as possible. It is understood that the tunnel at Cumberland Gap will be located at once, and placed under contract as quickly as possible. This is the most important piece of work on the whole line, and will be about four thousand feet in length.

The line from Bristol to Clinch river will be placed under contract quite early in the spring.

The managers of this enterprise are first class men, and capable of fulfilling all they promise.

We hope to chronicle the progress of the work from time to time as we are advised of it.

Good for West Virginia.

The supervisors of Brooke county, of the State of West Virginia, subscribed \$40,000 to the Pittsburg, Wheeling & Kentucky Railway Company, which, it will be remembered by our readers, is the link that connects the city of Wheeling with the Pennsylvania Central Railroad.

This subscription was ordered by the people of that county a short time ago, and makes a total subscription for Brooke county of \$100,000.

We understand that the county will issue seven per cent. five-twenty gold bonds to meet this obligation. These securities are first class, and ought to command the very highest price given for such securities in the money markets of the country.

The people of this county have done wisely in their support of this important project. They have shown themselves enterprising, and appreciative of a good work, and deserve all the advantages that can possibly occur from its success.

The Babcock Extinguisher.

A WORD IN PRAISE.

CEDAR RAPIDS, Ia., Sept. 12, 1871.

F. W. FARWELL, Secretary,

Dear Sir:—I have a word to say in praise of your justly celebrated Babcock Extinguisher. At a late fire in this city, owing to the bursting of a flue in our steamer, we were left with only pails of water to save a large warehouse filled with grain, when two of your machines were brought into use, and with them we saved—not only the warehouse—but the Aetna Mills, which would have burned had the warehouse gone. Fully \$150,000 worth of property was saved by the two Babcocks.

Respectfully, C. W. EATON,
Foreman of Hook and Ladder Co

Patent Office Report.

Editor of RAILROAD RECORD:

Your many readers interested in manufacturing pursuits are aware that the report which had been issued yearly from the Patent Office for thirty years was discontinued about two years ago.

This publication was invaluable to a numerous and useful class, and had our legislators confided its distribution to the Patent Office a much smaller edition would have served a better purpose and have been unobjectionable.

In its stead there is now issued a ponderous publication, in monthly volumes, containing a complete copy of every patent. The work is unexceptionable in execution and completeness, but will only reach a few large libraries.

The public, which is the great beneficiary of inventions, will be satisfied if the Patent Office sustain itself, and could have no objection if a portion of the three-quarters of a million of dollars surplus at its credit were expended in maintaining both publications.

The law disallows the plea of ignorance of any patent that can possibly affect one's interest. But how is a manufacturer to be informed if the records, however complete, are locked up in a few centers of population? It will be said that he may keep himself supplied with copies of patents on special subjects, but the very limited issue of the new publication (300) shows how small a fraction of the concerned are expected to incur this expense.

The present excellent and able Commissioner, it will be seen by the accompanying letter, is opposed to a resumption of the late form of reports; a view from which the writer and many others respectfully dissent.

G. H. KNIGHT.

CINCINNATI, Jan. 15, 1872.

U S PATENT OFFICE,
WASHINGTON, D. C., Jan 13, 1872.

My Dear Sir:—Yours of the 11th Jan'y, enquiring with reference to the weekly bound volumes of Specifications and Drawings of Patents issuing from this office; and with reference to the continuation of the old style of Patent Office report, was just received.

In reply to the enquiry, "How many copies of the present form are printed or may be printed?" I have to say that we contemplate printing three hundred copies of each patent, one hundred and fifty of the same to be bound, and the remaining one hundred and fifty to be placed on sale at the rate of ten cents a copy. Said publications being weekly, consequently there will be fifty two volumes per year. These bound volumes will be available by any public library who will pay for the binding of such, provided said books are free to the public for inspection. You request to know the name of the Western libraries subscribing for above named books. In reply I would state that the Cincinnati Public Library, the Dist. Court of Cincinnati, and the

Odd Fellows Library of San Francisco, Cal., are the only Western libraries that have as yet subscribed.

In reply to your question, "Is present Commissioner in favor of resuming old Reports from date of cessation, and will he recommend same?" I would say, No.

The Indexes for the years 1869 and 1870 are already printed, the same for 1871 is not yet out of the press.

Enclosed find circular relative to the bound volumes of Specifications and Drawings.

Very respectfully, &c.,

M. D. LEGGETT, Comm'r of Patents.
G. H. KNIGHT, Esq.,
Cincinnati, Ohio.

ALBANY HUDSON RIVER R. R. BRIDGE.—The first train has crossed this structure. The bill authorizing the construction of the bridge passed the Legislature in 1869, and the first stone of the superstructure was laid June 25, 1870. The main bridge is 1,525 feet long from Quay street to Van Rensselaer Island, and the whole length including approaches, 2,250 feet. It is 30 feet in the clear above low water mark, and 8 feet above the high water mark of 1857. There are two bridges over Van Rensselaer creek, one connecting with the New York and Boston railroads, and the other for Troy local trains, the first comprising three spans 62 feet 6 inches each in length, and the latter four spans 60 feet each. The portion of the bridge across the basin descends three feet from the pier to Quay street. The trusses in the superstructure are 26 feet apart. All the tension bars of the bridge are of double refined iron, and it is calculated that the bridge will stand a load of 6,000 pounds per lineal foot, exclusive of the weight of the structure, the strain of which will not exceed one-sixth of the breaking weight. Of the materials used, the following summary is given: Piles used in pier and abutments, 110,000 lineal feet; timber, board measure, 1,100,000 feet; stone in piers and abutments, 16,000 yards; iron in superstructure, mostly wrought, 2,000 tons. The draw weighs 700,000 pounds, and is to be worked by a ten horse power engine placed beneath the roadway.—*Albany Evening Journal.*

— At the annual meeting of the stockholders of the Terre Haute & Indianapolis Railroad, held at Terre Haute, January 2, the following directors were elected: C. Rose, W. R. McKeen, D. Ewing, W. K. Edward, F. Nippert, A. McGregor, and Joseph Collet, Jr. The directors elected the following officers: W. R. McKeen, President; W. H. Buckingham, Secretary; J. H. Hoge, Treasurer; M. S. Deerborn and John E. Simpson, Superintendents; C. R. Reddle Superintendent of Motive Power; W. H. Hubbard, Gen. Freight Agent; C. E. Follett, Gen. Ticket Agent.

— At the annual meeting of the stockholders of the Cleveland & Pittsburg Railroad held in Cleveland, January 2, the following board of directors for the present year was elected: Thomas A. Scott, Philadelphia; George Cass, B. F. Jones, J. N. McCullough, Pittsburg; R. P. Ranney, Cleveland; Jay Gould, Henry N. Smith, William Hoge, Charles Lanier, New York; George B. Roberts, Philadelphia; J. V. Painter, Cleveland, and William Thaw, Pittsburg.

Railroads in the United States.

The *Railroad Gazette* has compiled the following tabulated statement of the railroad progress of the United States, which shows at a glance the mileage at the close of each year and the increase for each year. It is taken from Poor's Manual, adding the figures for 1871:

Year.	Miles in Operation.	Annual Increase of Operation.	Year.	Miles in Operation.	Annual Increase of Operation.
1830...	23	.....	1851...	19,922	1,961
1831...	95	72	1852...	12,908	1,926
1832...	229	134	1853...	15,360	2,452
1833...	389	151	1854...	16,720	1,360
1834...	633	253	1855...	18,374	1,654
1835...	1,098	265	1856...	22,017	3,643
1836...	1,273	175	1857...	24,508	2,491
1837...	1,497	224	1858...	26,968	2,460
1838...	1,913	416	1859...	28,789	1,821
1839...	2,302	389	1860...	30,635	1,846
1840...	2,818	515	1861...	31,256	621
1841...	3,535	717	1862...	32,120	864
1842...	4,026	491	1863...	33,170	1,050
1843...	4,185	159	1864...	33,908	738
1844...	4,377	192	1865...	35,185	1,277
1845...	4,633	256	1866...	37,017	1,832
1846...	4,939	297	1867...	39,244	2,227
1847...	5,599	669	1868...	42,277	3,033
1848...	5,996	397	1869...	47,254	4,999
1849...	7,365	1,369	1870...	53,399	6,145
1850...	9,021	1,656	1871...	69,382	6,983

The following is a table of the miles of railroad completed in 1871 in the several States and Territories:

Maine	106
New Hampshire.....	64
Vermont.....	83
Massachusetts	117
Connecticut	190
New York	348
New Jersey.....	160
Pennsylvania.....	364
Maryland	115
Virginia	19
West Virginia	98
North Carolina	15
South Carolina	80
Georgia	95
Florida	12
Alabama.....	173
Louisiana	57
Texas	205
Arkansas	37
Kentucky	142
Ohio	174
Michigan.....	478
Indiana	340
Illinois	902
Wisconsin	314
Minnesota	451
Iowa	461
Nebraska	210
Missouri	508
Kansas	270
Indian Territory	124
Colorado.....	76
Nevada	16
Washington Territory	25
Oregon	55
California	99

By this it appears that the increase in New England was 560 miles; in the Middle Atlantic States, 872 miles; in the South Atlantic States (Maryland to Georgia inclusive), 422 miles; in the Gulf States, 447 miles; in the Southern Central States (Arkansas, Tennessee and Kentucky), 179 miles; in the Northern

Central States (Ohio, Michigan and Indiana), 992 miles; in the North-western States (including all the other States east of the Rocky Mountains), 3,116 miles; in the Territories, 225 miles; in the Pacific States, 170 miles.

Taking the figures for the beginning of 1871 from Poor's Manual again, we have the following as the mileage of each State and Territory at the beginning of the years 1871 and 1872:

States and Territories.	Area in sq. miles.	Mileage 1871.	Mileage 1872.
1 Maine	31,776	786	892
2 New Hampshire	9,280	736	800
3 Vermont	10,212	614	699
4 Massachusetts	7,800	1,480	1,597
5 Rhode Island	1,306	136	136
6 Connecticut	4,674	712	932
7 New York	47,000	3,928	4,276
8 New Jersey	8,320	1,125	1,285
9 Pennsylvania	46,000	4,656	5,020
10 Delaware	2,120	224	224
11 Maryland	11,184	671	786
12 Columbia, Dist.	60	.....	.....
13 West Virginia	23,000	387	485
14 Virginia	40,904	1,485	1,504
15 North Carolina	50,704	1,178	1,193
16 South Carolina	29,385	1,137	1,219
17 Georgia	58,000	1,845	1,910
18 Florida	59,268	416	458
19 Alabama	50,722	1,429	1,602
20 Mississippi	47,156	990	990
21 Louisiana	41,356	478	536
22 Texas	237,504	711	916
23 Arkansas	52,198	256	293
24 Tennessee	45,600	1,492	1,492
25 Kentucky	37,600	1,017	1,159
26 Ohio	39,964	3,538	3,712
27 Michigan	56,451	1,638	2,116
28 Indiana	33,809	3,177	3,517
29 Illinois	55,410	4,823	5,725
30 Wisconsin	53,924	1,525	1,839
31 Minnesota	83,531	1,072	1,523
32 Iowa	55,045	2,683	3,144
33 Nebraska	75,995	588	793
34 Missouri	65,350	2,000	2,508
35 Kansas	81,318	1,501	1,771
36 California	188,931	925	1,024
37 Nevada	112,690	593	600
38 Oregon	95,244	159	214
39 Arizona Territory	113,816	.....	.....
40 Colorado	104,500	368	444
41 Dakota	147,490	.....	.....
42 Idaho	91,932	.....	.....
43 Montana	143,776	.....	.....
44 N. Mexico	121,201	.....	.....
45 Utah	80,056	364	364
46 Washington	69,994	.....	25
47 Wyoming	93,107	492	.....
Total, U. S.	2,915,203	53,399	60,382

Mr. Poor's book was published in June, 1871, and it is quite possible that the figures taken from it include a portion of the mileage completed early in that year.

It is noticeable that the construction in the Eastern and older States was chiefly of short lines, indicating that these States are already pretty well supplied. In the West most of the lines are much longer, and some of great extent, the country growing rapidly and demanding and rendering profitable additional facilities for carrying its traffic.

In the four States in this immediate vicinage, viz.: Ohio, Kentucky, Indiana and Illinois, the *Gazette* gives the following details of construction:

OHIO.

A large amount of grading has been done on the Mansfield, Coldwater & Lake Michigan road, and on the Cincinnati & Dayton Air

Line, which latter is very nearly ready for the track. Work is progressing on, and prospects for completion are favorable for the Atlantic & Lake Erie, a long line from Toledo south-east to the Ohio river. The Baltimore, Pittsburgh & Chicago, a new line from Pittsburgh to Chicago, will probably soon be put under contract across the State, and efforts are making for the construction of a line from Dayton south-east to a connection with the Chesapeake & Ohio.

Marietta & Pittsburg.—Extended from the previous year's terminus (six miles south of Marietta) northward to Caldwell, 29 miles.

Newark, Somerset & Straitsville.—Completed from Newark (the junction of the Central Ohio and the Lake Erie division of the Baltimore & Ohio) southward 43 miles to Straitsville. Leased to the Baltimore & Ohio.

Lake Shore & Tuscarawas Valley.—Constructed from Cleveland southward through Medina to Seville, on the Atlantic & Great Western, a distance of 42 miles.

Cincinnati & Muskingum Valley.—This railroad (formerly the Cincinnati & Zanesville) was extended from Zanesville north to a connection with the Pittsburgh, Cincinnati & St. Louis Railway at Dresden, a distance of 16 miles.

Painesville & Youngstown.—Completed from Painesville south by east to Chardon, 12 miles. It is of three-foot gauge.

Columbus, Springfield & Cincinnati.—Completed from Columbus west to New London, 20 miles, completing a line from Springfield to Columbus which will form a part of the Cleveland, Sandusky & Cincinnati system.

Liberty & Vienna.—Completed from Liberty on the Cleveland & Pittsburgh road, near the Pennsylvania line, north to Vienna, 10 miles.

Cincinnati & Baltimore.—This road is six miles long and affords the Marietta & Cincinnati an entrance into Cincinnati. Two miles of it were completed in 1871.

KENTUCKY.

The completion of the Elizabethtown & Kentucky and the Maysville & Lexington is expected this season, and the Lexington & Big Sandy is likely to be commenced and advanced rapidly. Before the end of two years there will probably be a line from east to west across the State, connecting with the Chesapeake & Ohio. An effort is making to secure the construction of the Kentucky & Great Eastern, from Covington (opposite Cincinnati) down the Ohio to the Virginia line.

Elizabethtown & Paducah.—Extended from Caseyville (43 miles west of Elizabethtown) west to Nortonville, 67 miles.

Owensboro & Russellville.—Track laid from the Ohio river at Owensboro south to Livermore, on Green river, a distance of 21 miles.

Maysville & Lexington.—Completed from the Ohio river at Maysville south-west to Carlisle, 35 miles.

Shelby Railroad.—Track laid from Anchor-age (12 miles east of Louisville on the Louisville & Lexington line) east by south 19 miles, to Shelbyville.

INDIANA.

Detroit, Eel River & Illinois.—Constructed from Auburn (on the Jackson & Saginaw road 23 miles north of Fort Wayne) south-west to Roann, 55 miles. It is operated in connection with the Detroit, Hillsdale & Indiana road.

Indianapolis, Peru & Chicago.—Extended from Laporte north west to a connection with the Michigan Central at Michigan City, a distance of 13 miles.

Warsaw, Goshen & White Pigeon.—Track laid from a connection with the Air line of

the Lake Shore & Michigan at Goshen due south to Warsaw, 24 miles.

Lafayette, Bloomington & Mississippi.—Track laid from Lafayette west to the Illinois line, 37 miles.

Logansport, Crawfordsville & South-western.—Extended from Frankfort north-east 5 miles to Kilmore, and from Colfax south-west 49 miles to Rockville, the northern terminus of the Evansville & Crawfordsville Railroad, and forming now a line 64 miles long from Rockville north-eastward to Kilmore.

Cincinnati, Lafayette & Chicago.—Constructed from Templeton, a station on the Lafayette, Bloomington & Mississippi Railway, 16 miles west of Lafayette, north-west 45 miles to St. Anne, Ill., on the Chicago, Danville & Vincennes road. It has the use of the Lafayette & Bloomington road into Lafayette. Twenty-four miles are in Indiana.

Cincinnati, Richmond & Fort Wayne.—Extended from Winchester (25 miles north of its southern terminus at Richmond) northward 71 miles to Fort Wayne. It is leased by the Grand Rapids & Indiana Railroad, and has a contract for the use of the Cincinnati, Richmond & Chicago road from Richmond to Cincinnati.

Peninsular.—The part of this railroad in Indiana, from Smith Bend to the Michigan line, 10 miles, was completed in 1871.

Niles & South Bend.—This branch of the Michigan Central from Smith Bend, Ind., north to Niles, Mich., is 13 miles long, 7 of which are in Indiana, all constructed in 1871.

Evansville, Terre Haute & Chicago.—Completed by the construction of the northern section from Newport (31 miles north of Terre Haute) to Danville, Ill., 24 miles, 18 miles being in Indiana.

St. Louis & South-eastern.—The part of this road in Indiana constructed in 1871, is 27 miles long.

ILLINOIS.

The vast progress made in this State needs no further comment than the figures make. The total of 992 miles is nearly twice as much as that of any other State. A large amount of work has been done in the southern and central parts of the State, where, indeed, there was most room for new railroads. Still, few of these railroads are very long, and the State is eminent for the number as well as the aggregate length of its new lines. Of the lines on which considerable work has been done without any tracklaying, the Decatur & State Line, the Chicago, Pekin & South-western, the Plymouth, Kankakee & Pacific, the Cairo & St. Louis and the Peoria, Atanta & Decatur may be mentioned. It is not probable, however, that there will be as much construction this current year as last, and more is to be expected in the completion of unfinished lines than in the projecting and constructing of new ones, though there is promise of considerable activity in the latter direction.

Chicago & Iowa.—Extended from a point about half way between Rochelle and Oregon, north-west 24 miles to Forreston, on the Illinois Central.

Chicago, Burlington & Quincy.—Fox River Valley line extended from Aurora north to Geneva, 11½ miles.

Prophetstown Branch extended from Prophetstown north-west to the Mississippi opposite Clinton, Iowa, 16 miles. The track was laid on this branch for about 20 miles early in the year.

Chicago & Rock River.—The western section of this railroad, from Rock Falls (opposite Sterling, on the Chicago & North-western Railway) has been completed 20 miles east by south to Amboy, on the Illinois Central.

Illinois Farmers.—This road constructed in 1870 from Jacksonville south-east 20 miles to Waverly, was extended in 1871 to Virden, on the Chicago & Alton, 12 miles.

Toledo, Peoria & Warsaw.—A branch completed from La Harpe north-west 10 miles to a connection with the Burlington & Quincy line of the Chicago, Burlington & Quincy Railroad, over which it has an entrance into Burlington.

Peoria & Rock Island.—Completed by the laying of the track from a point about ten miles north-west of Peoria, where tracklaying was suspended in 1870, north-west to Orion, 63 miles.

Chester & Tamaroa.—Constructed early in the season from Tamaroa, on the Illinois Central, 80 miles north of Cairo, south west 10 miles to Pinckneyville, and in December very nearly finished through to Chester, 34 miles farther.

Chicago & Alton.—Track laid on Louisiana Branch from Roodhouse, on the Jacksonville Division 21 miles south of Jacksonville, west 38 miles to the Mississippi opposite Louisiana, Mo.

Bloomington & Ohio River.—Constructed from Bement, on the Toledo, Wabash & Western Railway, south 25 miles to Sullivan.

Decatur, Sullivan & Mattoon.—Constructed from Mattoon north-west through Sullivan to Decatur, 40 miles.

Paris & Decatur.—Completed from Paris west by north to Oakland, 18 miles.

Lafayette, Bloomington & Mississippi.—Track laid from Bloomington east 55 miles.

St. Louis & South-eastern.—Extended from Mt Vernon south-east to Evansville, Ind., 84 miles, of which 57 are in Illinois.

Shawneetown Division completed by the construction of the section between McLeansboro and Equality, 25 miles.

Chicago, Danville & Vincennes.—Extended from St. Anne, 65 miles south of Chicago, south to Danville, 63 miles.

Cincinnati, Lafayette & Chicago.—Constructed from St. Anne south-east 45 miles, to a connection with the Lafayette, Bloomington and Mississippi at Templeton; 21 miles are in Illinois.

Fairbury, Pontiac & North-western.—Track laid from Streator south-east to Fairbury, 30 miles.

Gilman, Clinton & Springfield.—Track laid from Gilman south-west to Springfield, 111 miles.

Springfield & Illinois South-eastern.—Track of north western extension laid from Springfield to Beardstown, on the Illinois river, 45 miles.

Southern Division extended from Edgewood north-west to a junction with the Vandana road at Altamont, 11 miles.

Carbondale & Shawneetown.—Completed from Carbondale east to Marion, 17½ miles.

Quincy, Alton & St. Louis.—Completed from Quincy down the east side of the Mississippi to a point opposite Louisiana, Mo., 42 miles.

Springfield & North-western.—Track laid from Havana, on the Illinois river, south-east 26 miles to Petersburg.

Pekin, Lincoln & Decatur.—Extended from Delavan (20 miles south-east of Pekin) south-east 47 miles to Decatur. Leased to the Toledo, Wabash and Western company.

Evansville, Terre Haute & Chicago.—The Illinois section from Danville south-east six miles, was completed.

—The subscriptions to the Northern Pacific Railroad bonds amounted to \$100,000 daily for the first four days of January.

Philadelphia, Wilmington & Baltimore Railroad.

The *Mining Register* says: "The annual meeting of the stockholders of this corporation was held in Wilmington on the 9th inst., when the report of the President for the last fiscal year was submitted. The following is an abstract of the report:

RECEIPTS—P., W. & B. R. R.	
Passengers.....	\$1,532,820 03
Freight and express.....	2,014,760 53
Rents	8,265 90
Mails and miscellaneous sources	93,018 63
Total	\$2,678,865 06

NEW CASTLE AND FRENCHTOWN R. R.	
Passengers	\$23,014 22
Freight	56,780 60
Mail	881 24
Total.....	\$83,676 06

Total earn's of both roads.....	\$2,762,541 12
EXPENDITURES—P., W. & B. R. R.	
Interest on bonded debt, ground rent, etc., less interest rec'd....	\$81,800 62
Operating expenses, including State and local taxes	1,692,598 42
Total.....	\$1,777,399 04

N. C. & F. R. R.	
Operating expenses	\$61,920 29
Tax on bonds to State of Delaware and New Castle county...	11,000 00
Total.....	\$72,920 29

Expenses of P., W. & B.....	1,767,399 04
Total expenses of both roads.....	\$1,850,319 33
Net earnings of the year.....	\$912,221 79

Div. of 4 per cent. and U. S. tax	\$841,587 69
U. S. tax paid under protest....	10,322 96
Total	\$851,910 65

"The report then goes on to state that the gross receipts were larger than those of 1870 by \$117,242.24, and that the operating expenses exceeded those of 1870 by \$57,233.67. The peaches transferred over the road amounted to 2,650,000 baskets, or over 5,000 car loads of eight tons each, showing that this business has more than quadrupled since 1865.

"Referring to taxation, the report says that the tax upon the railroad is thirty times heavier than upon any other taxable property, which is collected out of the peach growers, and the hope is entertained that a more equitable system of taxation will be devised.

"The work on the Darby improvement is then referred to and the confident hope indulged that it will be open to travel by the 1st of July next. It promises to be beneficial to both the country through which it passes, and the road in an increase of travel.

"The loss by the fire at the depot, by which the round house and several locomotives were destroyed, was covered by insurance to its full extent but by \$10,000. This has all been repaired, and the adjacent lots, where the fire originated, have been purchased by the company so that there is less liability to loss from this source.

"The report closes with reference to the condition of the road, and reveals the fact that thirty five miles of track have been relaid with steel rails or steel head rails.

"The following officers were elected:

President—Isaac Hinchley.

Vice President—Enoch Pratt.

Secretary and Treasurer—Alfred Horner.

Directors—Isaac Hinchley, Samuel M. Felton, Wm. Sellers, Samuel Welsh, Jesse Lane, Joseph Bringham, Samuel Hurlan, Jr., Thomas Kelso, Enoch Pratt, Thos. Donaldson, Thos. Whitridge, Samuel M. Shoemaker, Jacob Tome, Nathaniel Thayer, William Minot, Jr."

Lehigh Valley Railroad

The *Mining Register* says: "The annual meeting of the stockholders of the Lehigh Valley Railroad was held Jan. 8th. The following is a brief abstract of the annual report:

"The total coal tonnage for three years is as follows:

For 1869.....	2,331,407 tons.
" 1870.....	2,622,433 tons.
" 1871.....	2,889,071 tons.

"Of which last amount 1,715,220 tons have been carried in the four months from July 31st to November 30th (the close of our fiscal year), showing a carrying capacity of over five millions of tons if the trade could be evenly distributed throughout the year.

"Our passenger and general freight business have continued to increase.

The receipts from all sources (including interest on investments, income from coal, land, &c., amounted to.....	\$5,952,382 23
Operating exp of the road.....	3,462,029 78
Net income.....	2,440,352 45

The following officers were elected for the ensuing year:

President—Asa Packer.

Directors—Charles Hartshorne, William W. Longstreth, J. G. Lingham, F. L. John Taylor Johnston, Wm. H. Gutzmer, David Thomas, Ashbel Welch, Elw. H. Trotter, Aris Pardee, William L. Conyngham, Edward Roberts, William A. Loughlin."

APPLICATION OF AIR POWER TO STREET LOCOMOTION, INCLUDING FRAMWAYS.—Mr Hard of Wakefield, with Mr Froth of Leeds, has made a preliminary application for letters patent for applying compressed air as a motive power for drawing omnibuses and other vehicles and entirely doing away with horse power. Should the proposed plan be adopted, it would completely revolutionize our present mode of street traveling, and it is expected to effect a great saving. For carrying out his scheme Mr. Hard proposes to erect in some central place in any town a colossal air compressing engine with suitable buildings, the same as gas works, with receivers, pipes, &c. The mains would be laid in the street on the surface, and in such a way as to form the road, gutter, or even pavement. The air would be sent from the receivers into the pipes, which could be tapped and taken away at such points as might be deemed convenient. Mr. Hard is engaged, we understand, in preparing a series of models showing the means by which he proposes to carry out his plan.—*Herald*

—Freight arriving at a station to which it has been assigned by its owners, where the company has no warehouse must be looked after by its owners. If lost after its arrival, the loss falls on the owners. Such is the order of the Supreme Court of Pennsylvania, affirming the judgment of a lower court in the case of McMasters versus the Pennsylvania Railroad Company.

Transmission by Pneumatic Tubes.

The propulsion of bodies by pneumatic pressure had, perhaps, its first example in those feathered darts which certain savage tribes project at their enemies by blowing them through hollow reeds. The principle of this is the same as that of the atmospheric railway so-called, which, in various forms, has in this country and in England been the subject of between fifty and one hundred different patents. The system—apart from the partially developed scheme of the pneumatic tunnel under Broadway in New York city—has been advantageously carried into effect mainly in the transmission of packages, for which it is apparently capable of almost indefinite extension. In London, Paris and Berlin it has been used with the most decided success for the transmission of messages between telegraph offices, and it is now proposed in the first named city to adopt the plan for the city letter postal service—a purpose for which it has also been advocated by parties in New York, who, as we understand, have been carrying on experiments to test the feasibility of connecting it with the lamp-post letter-box system. The prospectively increased utility of this mode of transporting postal matter of all kinds gives importance to recent improvements or modifications in it; and some interest at least to the form in which many years ago it made its first appearance.

The most recent experience with the pneumatic tubes in London has given an average speed to the carrier of about nine feet per second, the velocity being least at the point farthest from the appliances by which the vacuum is produced, and gradually increasing as the carrier nears the latter. The necessity of a steam engine complete, with air pumping machinery, etc., was found to be an objection of no little weight to the introduction of the pneumatic tubes; but this has of late been remedied by a device at once simple and it is claimed effective, and of which the cost is but one-twentieth of that of the motor and the mechanism at first employed. An annular steam jet from a suitable generator is caused to issue away from, but concentric with, the vacuum end of the tube, and by its inductive action draws the air in a continuous current from the interior of the tube. By this means, at a cost of working less than that of a steam-engine of the power needed to produce the same result, a vacuum equal to a column of twenty-three inches of mercury was readily obtained.

We have briefly referred to the form in which the pneumatic tube was first projected for a purpose closely analogous to its present one. It was on February 9, 1824, forty-eight years ago, that John Vallance received an English patent on "a method of communication or means of intercourse, by which persons may be conveyed, goods transported, or intelligence communicated from one place to another with greater expedition than by means of steam carriages, steam or other vessels, or carriages drawn by animals." The means of carrying on his invention, which includes the more essential features of all that in this line has been projected since, he described as follows: "A hollow tube or cylinder reaches from one to the other of the places between which communication or intercourse is to be made. The tube is composed of cylindrical pieces about twelve feet long, six feet in diameter and one inch and a quarter in thickness, and bored out truly cylindrical. They are laid and imbedded in masonry and carried over rivers on bridges; at the joints, to make them tight, they are hooped round, a

quarter of an inch being left for expansion. A piece of cast-iron is fixed along the bottom of the cylinder to form a groove, channel or track for a wheel to run on, similar to a railway. A hollow cylinder or piston made of framework, about twelve feet long, is placed inside the tube, with a wheel in the center intended to run in the groove or channel inside the tube. This combination of apparatus by which persons may be conveyed or goods transported from one place to another by being placed inside the piston or traveling vehicle, is moved by forcing air in behind it or exhausting it from before it by an arrangement of valves and air pumps."

The only material defect apparent in the plan as thus described seems to be that the tubes were to be cast in sections of great size, and the production of which was especially difficult half a century since. Had the inventor devised a cheaper tube, he would have nearly perfected at the outset the theory of a pneumatic passenger railway, and, had he confined his ambition to the transmission of light parcels, he might, in those days before the electric telegraph, have anticipated by many years the now prospective success of the atmospheric postal system.

The Boston and Maine Railway Injunction Case.

The Supreme Court of Massachusetts, before which this case has been argued, has issued the following rescript:—

By the statute of Maine, approved February 17, 1871, the Boston and Maine Railroad was authorized to extend its railway from Berwick to Portland, and for that purpose to increase its capital stock and to issue new shares. According to the laws of Maine, it was authorized under this act to issue the new stock in the manner provided in the vote set forth in the information. After the defendant had obtained this authority, the Legislature of Massachusetts passed the two statutes upon which this information is founded, being chapters 381 and 392 of the acts of 1871. Both were approved the same day. The first act (chapter 389), among other things, prohibits any railroad corporation in this State, which is consolidated with a corporation in another State, from extending its road or increasing its capital stock without the authority of the Legislature of this Commonwealth, under the penalty of rendering its charter and franchise liable to forfeiture, but it contains the express proviso that "nothing herein contained shall be construed to prohibit the Boston and Maine Railroad from extending its railroad to Portland, in the State of Maine, under the authority granted by the Legislature of that State." The proviso exempts the defendant corporation from the operation of the act, so far as regards the extension of its road and the increase of its capital for that purpose, and as incidental thereto, according to the authority of the statute of Maine. Chapter 392, which provides that "a railroad corporation authorized to increase its capital stock," shall sell the new stock at auction in the city of Boston, appears to have been intended to apply only to corporations authorized by the Legislature of this Commonwealth to issue new stock. If it be admitted that it was intended to apply, not only to corporations whose roads are wholly within the limits of this State, but also to such consolidated corporations as obtain authority of our Legislature under chapter 389, it does not reach this case. The exemption of the defendant from the operation of

chapter 289 takes it out of chapter 392. It is not within the terms of the last named statute. By the joint construction of both statutes it appears that it was the intention of the Legislature to exempt the Boston and Maine Railroad from their operation so far as the proposed extension to Portland is concerned, and to sanction such an extension under and in the mode provided by the statute of the Legislature of Maine. It follows that the action of the defendant corporation which is complained of was legal, and that this information must be dismissed.

Charles Allen, attorney-general, and Charles F. Adams, jr., for the Commonwealth, and E. R. Hoar and C. F. Choate for the defendants.

Knowledge is Wealth.

It is a common saying, that "knowledge is power;" but we may with the same foundation for truth also say that knowledge is wealth, as ignorance often begets not only weakness but also poverty.

For the same reason that the civilized and enlightened nations are more powerful than barbarians, they are also more wealthy. One of the most striking illustrations of this truth is found in the condition of the present population of the North American continent, and the people that inhabited its beautiful and rich soil two and a half centuries ago. While the descendants of the latter dwindle away in poverty, the posterity of the Europeans are increasing in wealth in a ratio of which history furnishes no parallel example.

Look, for instance, at the cities springing up everywhere, and of which an estimate in money value gives an real valuation of their worth for the progress of humanity. Glance at the value of the coal, of the agricultural productions, of the manufactures; each far surpassing in value the production of noble metals from the soil. From a land peopled for thousands of years by the savages, the Caucasian race has extracted of noble metals \$20,000,000 on the Atlantic coast, and \$1,500,000,000 on the Pacific shores since the mines were opened.

It is only knowledge which has made all this possible. The lack of knowledge causes enormous losses among those who speculate beyond their range of information, bringing them sometimes to poverty. This is daily illustrated by reports of failures in mining operations. A case in point which we now remember was a late report of discoveries of tin ore in Utah Territory. Chemists in Utah supposed, and, in fact, were certain, that they had found indications of that metal, while at the Land Office, in Washington, no trace of tin was discovered in the selfsame ore. If there was no dishonesty in the first chemist, he was most deplorably ignorant.

In Colorado, some three years ago, a like discovery was claimed to have been made; parties showed us what they pretended to be tin ore, certified by the analysis of a local chemist. We recognized the apparent pieces of tin at once as garnets by the crystalline form, which is quite different from that of that variety of tin ore which is so abundantly found in the East Indian island of Banca, and which is a source of enormous profit to the Dutch company which owns it. A superficial knowledge of this fact, together with ignorance of crystallography, caused the two substances to be confounded; a mistake which resulted in the ruin of several parties who had too hastily invested in this supposed tin mine.—*Manuf. & Builder.*

Japanese Carpenters.

The Japanese carpenters are ingenious workmen, and their work is done with marvelous neatness. A curious feature of their houses is that they do not contain a nail, all the joints and timbers being dove-tailed together by many ingenious devices, and the whole work, even to the rafters, is as smooth as if it had been polished down with sand-paper. And the Japanese are a neat people; for they use no paint to hide any blemish of construction or ornamentation, no filigree work or plaster of Paris gew gaws, but every stick in the building is exposed. Every morning, as regularly as she cooks the breakfast or sweeps the floor, the Japanese housewife takes a wet cloth and scours the whole interior of the dwelling leaving no part untouched and no stain or dirt spot to mar its clearly appearance. Then the Japanese do not come into the house with muddy boots, after the style of the American sovereign; but having covered the floor with neat matting always remove the dirty sandals before stepping upon it. I stood and watched the Japanese carpenters at their work for some minutes, and noticed the peculiarity of their movements. The Japanese carpenter works towards him—that is, instead of shoving a plane upon the board at arm's length, he pulls it towards him; and he cuts, saws and chops in the same way. His saws are fixed in handles like a butcher's cleaver, and the teeth slant or rake toward the handle. The planes are constructed like ours; but the wooden portion is very thin and wide. The adze is fastened to the end of a hooped stick like the handle of one of the crooked canes worn on the arm on our streets; and although their tools are different from ours, yet I can not observe that they are awkward in appearance or awkwardly handled.—*Exchange.*

IRON—NOW AND THEN.—In 1791, England and Wales had 73 coal furnaces, making 67,548 tons of iron, an average of 925 tons per annum for coal furnaces. Scotland had then 12 furnaces, making 12,480 tons per annum, or 1,040 tons per furnace. England had then 20 charcoal furnaces, making 8,500 tons, 425 tons per furnace yearly. Scotland had two charcoal furnaces, making 1,000 tons, or 500 tons each, yearly. England then imported from Sweden and Russia at the rate of 70,000 tons per annum of iron, at the rate of £35 per ton. Previous to the Revolutionary war, England imported a large supply of iron from New Jersey, Maryland, Virginia and Pennsylvania. Now, England, after a lapse of only 80 years, makes about 5,000,000 tons per annum. In 1840, the whole make of the United States did not exceed 285,000 tons per annum. In 1870, only 30 years later, the amount of iron made in this country was seven times that amount, about 2,000,000 tons; and in the year 1890 the production of this country will be fully double that amount.—*Am Trades Union.*

NEW NOTION FOR PAPER.—A scheme is afloat among very influential Swedish proprietors, including Prince Oscar, to utilize the larch forests of the country in a new fashion by manufacturing paper out of timber. Machinery for the purpose has lately been procured in England.

President Gowan of the Reading Railroad, Conn., receives \$30,000 a year, the largest salary paid to any railroad officer in the country.

BELGIAN STATE RAILWAY.—To meet the wants of the colliery proprietors in Belgium, and to appease the bitter complaints as to the scanty supply of rolling stock, the Belgian Department of Public Works proposes to place 1,000 new 10-ton coal trucks upon the system. It is also proposed to purchase fifty-eight locomotives with tenders, and thirty tenders for locomotives furnished previously without tenders.

—The Lancaster *Intelligencer* of January 3d, says in regard to the East Brandywine & Waynesburg Railroad: The subscribers to the stock of the extension of the above railroad to New Holland, held a meeting at the Styer House, on Tuesday, December 26, which was largely attended and much interest manifested in the success of the project. T. M. Storh, John Styer and John S. Wallace were elected to serve as directors to represent the western end of the road. The amount of stock already taken, together with the aid promised by the Pennsylvania Railroad Company, renders the speedy construction of this road to New Holland a certainty. A contract will be entered into with responsible parties as soon as possible, and the weather permitting work will be commenced immediately.

JET OF SAND.—The new mechanical agent, the "jet of sand," has as yet only exhibited a fraction of its possible applications. The latest adaptation its inventor has succeeded in developing into practical efficiency is to a peculiar process of replacing the art of wood cutting. The few experiments conducted in this direction in America have promise of success. The process consists of bringing upon a suitable matrix a photographic copy of the drawing or engraving which it is desired to reproduce. This is then passed beneath the sand blast, and the cutting thus obtained. This is finally subjected to the electrotyping process, and any desirable number of copies thus produced. The same invention has been successfully applied to the decoration of marbles and other stones for ornamental purposes. For this purpose the blocks are protected with an open design of sheet iron, or of sheet rubber, and the steam sand jet directed upon them from a convenient distance.

—The Memphis Chamber of Commerce recently proposed to the St. Louis Chamber of Commerce a joint convention to prepare a plan of expenditure by the General Government to redeem the lowlands of the Mississippi; for the diversion of rivers by means of canals; for the preservation of the navigation of the Ohio river; for a canal from the Mississippi river to Lake Michigan, and a ship canal from New Orleans to the sea. In noticing this the Chicago *Tribune* suggests that as these several works would, in the aggregate, only involve the expenditure of \$100,000,000, the same convention might include the completion of the steamboat canal from the Kanawha river to Richmond; a like canal from Chattanooga to Savannah; the improvement of the Plate river to make it navigable from its mouth to its source; the purchase and enlargement of the Erie canal, and a canal around the falls of the Upper Missouri. "When the Government goes into the river and canal business at all," says the *Tribune*, "it should go in largely, say to the extent of \$500,000,000."

—Joss sticks, used altogether by the Chinese, bring an annual revenue of \$23 40 to the United States Government.

NEW SOURCE OF IODINE.—Thus far most of the iodine of commerce has been obtained from the iodide of sodium, contained in the ashes of sea weeds, but as the demand for this substance, so necessary for the modern physician, the photographer, the chemist, the manufacturer of paint and dyes, etc., has lately so enormously increased, other sources of supply have been sought. Among them is the Chili saltpetre, a mineral nitrate of soda, used for gunpowder, after having been transformed into saltpetre, or nitrate of potassa. It is also used in different fertilizers. This nitrate of soda contains iodide of sodium, which remains behind in the mother liquor which is left after the manufacture of saltpetre. Thiercelin has found that when this liquor is treated with a mixture of sulphurous acid and sulphite of soda, the iodine is precipitated as a black powder. It is then dried, and is either sold in this impure crude state, or further purified by sublimation. The amount of iodine thus reclaimed from Chili saltpetre already amounts to more than 30,000 pounds per year.

—The two side spans of the St. Louis bridge are each 497, and the middle span 515 feet long. This last is the length of the Kailenberg bridge in Holland. The Menai bridge spans 570. The Montreal bridge has 24 piers, but no span over 275 feet. The Niagara bridge span is 821 feet, 245 feet high. The East river bridge will span 1,600 feet, and have a mid height of 130.

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The Financial Movements and Aspects of the Times.

In some previous articles we have expressed our conviction that the amount of active capital would be increased, and the rate of interest lowered, as time advanced. Events have proved this true, in the past year; and, unless there is some great war, to absorb the money and retard industry, the amount of active capital will be still increased, and the rate of interest lowered, in the present year. For this result there are sufficient and pressing causes at work. We shall speak of them directly. In the meantime let us notice some of the present effects.

After the war, for two or three years, the 6 per cent. bonds of the Government were scarcely at par, in fact they were not at par in gold. For the last three or four years they have been above par. But, in the last year, we see not only that the 6 per cent. bonds were above par, but that the Government have negotiated \$200,000,000 at 5 per cent., and that these new bonds are above par. Hence, we are not surprised to hear of the offer of Jay Cooke & Co., and the Rothschilds, to take \$600,000,000 at 5 and $4\frac{1}{2}$ per cent., making the average $4\frac{1}{2}$ per cent. Now, let us see what these bonds would be worth at the present market price. Five per cent. bonds are now worth 110 in currency, and 101 in gold. This makes 1 per cent. interest, equivalent to \$22 in currency, and \$22 50 in gold. A bond at $4\frac{1}{2}$ interest is therefore worth now in the open market \$104.20 in currency, and \$94.36

in gold. Looking to the London quotations, we see that this American $4\frac{1}{2}$ per cent. bond is actually worth more in the London market than the British consols. These great bankers are, therefore, very shrewd in their calculations. They take the chances, of course, of any great wars or revolutions, but that is the only chance they take. Under ordinary circumstances, even with such a war as the Franco-German, they will make great profits; for we see that the course of events is to lower the rate of interest, and therefore to increase the price of the bond. This tendency will continue, and it is very probable that in a few years the rate of interest on perfect security will not be over 3 per cent. It is a part of the proposition to take three years to complete the contract. If there be no wars or convulsions in that time, we undertake to say that a 4 per cent. United States bond will be at par. It is plain from these movements of the great bankers, that they believe precisely what we do, that money will cheapen, and that rapidly. Let us now consider the general reasons on which this opinion is founded:

1. In one of the earliest numbers of the RECORD (1854) we prepared a table showing on the highest financial authorities, through the whole experience of this country, what had been the actual amount of money, both gold and paper, in the country. This amount varied from \$6 to \$13 to one of population. The present population of the country being 40,000,000, this would give an amount of money at the present time equal to \$240,000,000 or \$520,000,000, as the case may be. We really have \$700,000,000; and unquestionably the commercial transactions are much easier, and the facilities of exchange both greater and cheaper. The country is, judging from the only test, experience, commercially in a much better condition. What is true of our country is to some extent true of all civilized countries. The amount of paper money and the facilities of exchange are everywhere greater. But what is the cause of this? For money, especially paper money, must have a basis of actual values, or it will not be credited as money. Let us now come to that.

2. If we look back to the RECORD of 1854, in which there is an accurate table, we find that the proportion of gold in the country was very small—small in proportion to the people and to the amount of paper money. Now, it is the reverse. Gold is abundant. It is daily sold in great masses, and is exported by tens of millions. Here we have the great cause of the moneyed change going on in the world. Let us look at this and see what a great change has gone on in the proportion of what men consider the standard of value, gold. In 1846, the war with Mexico terminated with our acquisition of California. In 1848-9 began the gold digging there. Now, from about 1850 to the present time we have averaged a production of gold equal to \$50,000,000 per

annum. The production of California has decreased, but the production of Idaho, Colorado and Montana has more than made up the deficiency. It is entirely within bounds to say that from 1848 to 1872 the gold production of the United States exceeds \$1,100,000,000. In addition to this, Australia has for sixteen years been producing gold at an average of \$40,000,000 per annum. In the meantime Russia constantly produces many millions per annum, making in the same period \$400,000,000. In something like twenty years the new gold fields have produced at least \$2,000,000,000. Now, what was the effect of this immense mass of gold poured into the commercial currents? The first effect was to do something which if it had not been done soon the want of would have caused a commercial revolution, and the world would have been compelled to adopt paper money universally; this was to fill up the then almost vacant commercial reservoirs, such as banks, bankers, great merchants, etc. It took an immense mass of this new gold to fill up these reservoirs. Thoughtful men in 1850 thought that this effect would soon follow which we see; but the element of time enters into all human experience, and especially into all great commercial changes. Now we see it coming rapidly. The great reservoirs are filled, and the gold begins to flow out into ordinary commercial channels. Then gold, which commercial men consider the standard of value, becomes again the basis of paper money and commercial credit; and then money (the money of the markets) becomes abundant, and the result of that will be to cheapen interest. As a consequence of all this is just what we see, that the bonds of the Government and of good railroads are in demand, and will continue to be so probably for many years to come. E. D. M.

AIKEN, S. C., Jan. 25, 1872.

PROGRESS OF RAILROAD CONSTRUCTION.—More miles of railroad were constructed in this country last year than in any previous year, being a total of 6,983. The number of miles of railroad now in operation in the United States is 60,382. Illinois is the greatest railroad State, the total number of miles of railroad now in operation in the State being 5,725; the second is Pennsylvania, 5,020; the third is New York, 4,276; the fourth is Ohio, 3,712; the fifth is Indiana, 3,517; the sixth is Iowa, 3,144 miles. Illinois built 902 miles of road in 1871, being about fifty per cent. more than any other State, except Missouri, which built 508 miles. Iowa built 481 miles last year.

—From a carefully prepared estimate of the extent of railroad communications now existing, it appears that there are 450,000 miles of railroad in Europe, 180,000 in America, 14,000 in India, 10,000 in Australia, and 30,000 miles of submarine cables to different points. This gives a total of 684,000 miles, which is increasing at the rate of about 100,000 miles per year.

Signs of Progress.

A gentleman of Greenup county, Kentucky, of good intentions no doubt, but evidently unused to giving his opinions to the public through the press, in an attempted reply to an article in the *Railroad Review*, shows that he has illy considered his subject, and has consequently given his readers an article rather remarkable for its length, its errors, and its excessive scattering, without even a single shot hitting the mark at which it is aimed.

But he makes the following wholesome confession, which to our mind answers himself, and completely sets aside all that he had labored through three mortal columns to prove. He says:

"A few years ago the Kentucky Improvement Co. commenced business in our county—locating and building their railroad from Riverton to Hunnewell Furnace, expending large sums of money in improvements of various kinds—not asking the people for one cent; adding over half a million to the taxable property of the county.

* * * * *

"The Ky. Improvement Company after having made this vast outlay for the purpose of bringing into market the latent wealth of our county, find they are deceived in the coal deposits that they relied upon, not proving to be of sufficient thickness, to pay for mining and transporting, and to be almost, if not entirely, worthless as a smelting fuel. Here was a dead lock. Their property as it stood, was of little, or no value; they must advance further into the coal fields, or lose all; they felt that they might reasonably expect aid from a people for whom they had done so much, and to whose interest a further prosecution of the work would inure as much as their own; in order therefore to raise money for the purpose above indicated, a new company was formed under the name of the Eastern Kentucky Railway; they placed their bonds upon the market (mind you, not their stock), making them payable in twenty years, bearing interest at the rate of 6 per cent. per annum, payable semi-annually, and secured by a first mortgage upon the road, between Hunnewell and Grayson, making the investment not only a safe but paying one. How did our people meet this generous offer, in which their material prosperity was, and is, deeply involved? Strange as it may appear, some of the same individuals that are now harping so keenly for stock in the Ky. and G. E. R. R., upon which they propose to pay an interest of at least 12 per cent., with no security that said stock will remain theirs for a year after its issue—these same individuals, I say, turned a deaf ear to this liberal proposition of the E. Ky. R. R. Co., and said, let those that want railroads build them.

"But the E. Ky. R. R. Co. were not to be discouraged but with an almost unexampled spirit of energy and enterprise, despite the ungenerous disposition manifested by our people, they have succeeded in pushing their road through to the town of Grayson, Carroll county, Ky., giving employment to hundreds of laborers, whose earnings have been expended in our midst, besides opening up a new field of trade for our merchants, whereby their trade has been almost doubled, and still on the increase; and now, like Moses of old,

they are in sight of the goal of their ambition, to wit., the rich coal fields of North-eastern Ky."

We suppose this gentleman wanted to say that the Kentucky Improvement Company, reorganized into the Eastern Kentucky Railway Company, wanted Greenup county to take part of the bonds this company proposed to issue, for the purpose of extending its road and getting out of the thin veins of coal that are found in Greenup county; and that the county was so ungracious as *not* to do so. We say that we suppose this is about what the writer meant to convey to his readers when he wrote that the "Eastern Kentucky Railway Company placed their bonds upon the market," etc., because if he did not mean this, there is neither sense in the last column of his article, nor relevancy to the subject he has under consideration. And if this is what he means, then he has confessed, that this railroad company, by the construction of less than thirty miles of road in the county, added more than *half a million dollars to the taxable property thereof*; that latent wealth of the county was brought into utility; that they might reasonably expect aid from a people for whom they had done so much, and to whose interest a further prosecution of the work would inure as much as it would to that of the company itself; that the material prosperity of the people of the county was deeply involved in this enterprise, and that they were so ungenerous, after all that had been done for them, and so indifferent to this "liberal proposition," that they turned a deaf ear to it, and cruelly said, "let those that want railroads build them."

This is capital—downright refreshing. If the writer was in favor of the "liberal proposition" of the Eastern Kentucky Railway Company, he scores the unappreciative denizens of his county with a heavy hand; but if at that time he too was "ungenerous," and turned his "deaf ear," he comes out manfully and heroically, plumply acknowledges his mistake, confesses, and should therefore be cheerfully shriven, particularly as he proposes to make such atonement as is in his power, by inciting the people of his county to grant what was before refused, and to turn the other ear to the petitions of the Eastern Kentucky Railway Company, when they shall again, if they ever do, solicit the people to buy their bonds. True, the said company is not now making any such propositions to Greenup county, nor any other, nor do we suppose that if this county should want the bonds of the Eastern Kentucky Railway Company they could be had, all this makes no difference, this gentleman means well and his intentions should be respected. One thing we are sure of, he will always be found upon the side of public improvements in Greenup county. Let others do as they will, he will not, nor without raising his voice defiantly against such folly, will

he permit his county to repeat the folly of recording her want of generosity, and refusal of a "liberal proposition," made by any corporation that proposes to build a railroad in his county, and thereby add "more than half a million dollars to its taxable property," and develop more of "the latent wealth" that so abounds therein, and contribute so immensely to the material prosperity of the people of that country whose interests are so deeply involved in all such enterprises. Whatever others may know about such things, this gentleman is certain of these results, they have occurred under his own observation and he hath blazoned them to the public.

True, there may be some difference in roads. That is to say, one road may produce larger results of this sort than another, but still they are sufficient, and so certain as to always render such improvements desirable, and besides there is no knowing what a railroad may develop. Others than this worthy gentleman, and the good people he so valiantly defends and learnedly instructs, have been deceived before, and been equally ungenerous, and refused quite as liberal offers, but we are happy in saying that history records that they, too, like this estimable friend of ours, and we hope the people of his county, have changed their opinions with the changes of time and the potent lessons of experience, and come out strong for reform, sorrowing for the mistakes they made, and regretting the calamities they had brought upon themselves, but zealous forever afterwards in advocating what they once condemned.

These are the most encouraging signs of progress, and augurs well for humanity. While such men as our worthy friend are writing themselves *away* from their prejudices and mistakes, we can afford to watch and wait, and shall therefore "possess our souls in patience."

Mackinaw.

For years we have contended that the time would come when the southern side of the Straits of Mackinaw would become an important railroad center, and would probably assume a commercial importance in the Lake trade second only to Chicago, and perhaps Milwaukee. We have written articles enough upon this subject to fill a good large volume, and have made more than a score of addresses to the people of North-western Ohio and Southern and Central Michigan, to demonstrate the value of this point to them as the ferrying ground to the railroad system that will sooner or later grow up in the north-western part of our American possessions.

For all our efforts in this direction we were pronounced visionary and impracticable, as predicting events which would likely never transpire; or, if they ever did occur, it would only be when the middle of the next century

was reached, if the world should stand so long.

To show that we were not so visionary as was claimed by those who ridiculed our predictions, we clip the following note of what is going on in that hyperborean country, from one of our most reliable exchanges. A few years more will demonstrate that all our prophecies of the future railway importance of the Straits are to be more than realized.

ON TO MACKINAW.—It is stated that notwithstanding the severity of the weather, the race to the Straits of Mackinaw, between the Jackson, Lansing & Saginaw and Grand Rapids & Indiana Railways, is kept up with vigor. The first there will be able to make the best arrangements, not only in regard to location, but with the Northern Pacific Railroad. The G. R. & I. road has reached Clam lake, but there is no pause there. The cry is still onward. The J., L. & Saginaw road, although operated only to Wells, is graded eight miles beyond, and of this distance the iron is laid three miles.

More Narrow Gauge.

The *Manufacturer's Journal*, of Harrisburg, Pa., in an elaborate article upon the Narrow Gauge questions, among other good things says:

"It is a noteworthy fact that the claims of the narrow gauge adherents, in the cost, capacity and utility of their plan, have not been met with anything like the opposition and rebutting evidence which is usually expected in cases where a question is raised any way near as important as this one. The principal opponent so far, who has given his views to the public in detail form, is Silas Seymour, at one time chief engineer of the Erie Railroad, and he fails to show that the narrow gauge people are absolutely wrong, but simply cites evidence to show that they may be disappointed in their expectations.

* * * * *

"The anthracite mountains of Penn. have been traversed by narrow gauge roads for more than thirty years. The Mauch Chunk road is a narrow gauge—three feet; the Nesquehoning Railroad, and the Carbondale Railroad, are narrow gauge. These were the first in the country, and were rapidly added to, all over that region, since about the year 1835. The Delaware & Hudson Canal Co., who own the road to Carbondale, imported the first locomotive used in this country. They have continued to use locomotives on their road—though it is in part gravity; and the amount of coal traffic done by them proves conclusively that a narrow gauge will not limit a business, but rather facilitate it in the ease and rapidity with which it can be handled. But few, if any, of the engineers who have been accustomed to these narrow gauges ever dispute their adaptability to be operated with locomotives, but some of them were built as gravity roads because the nature of the country demanded it; and it is no unusual thing to transport at the rate of 5,000 tons of coal per day over one of them, or 10,000 tons per 24 hours. And these roads do not cost to exceed one-half that of the broad gauges which run almost by their side, and not more than two-thirds as much to operate."

An Important Question.

The *Commoner* of last week calls the attention of the railroad managers of our city to a subject which has no doubt often been seriously considered by them, and yet, for some unaccountable reason, they have rarely sought to reform in the right way and at the right time. Our railroad builders are usually in too much of a hurry to get their work done and off their hands to care much about its future, and the usual changing of new roads from one owner to another by sale of their stocks or other securities, does not prompt that kind of interest in their permanent business requisite to look into their necessities for success. It is only when they have passed into the possession of parties who hold them for profit, or business, or when they have passed through the speculative period of their existence, and shown their strength and character, that they begin to improve, and then it is found that they have not the capacity to do the business crowded upon them, and must be nearly reconstructed; and, above all, that they are without the necessary room at their termini, and important points along their lines, to handle economically a quarter of the traffic they have created and gathered to themselves. This is the one universal complaint, the grave difficulty in the way of their prosperity, which can only be overcome by so great an expense as to often prevent dividends upon their cost for many years.

We have in our mind an instance where a railroad company purchased ten acres of ground at a point where they intended to locate a station. The price paid was comparatively small. Within a year they sold one-half for the sum paid for the whole, and thought they had made a good bargain. Since the road was built, and its business connections made, they have been compelled to repurchase the half so sold for ten times the amount they received, although there has not been a single improvement made upon it, and still this company could profitably occupy at this point five acres more.

We believe this has been the experience of every road of importance in this country, and the same is true, though in a more limited extent, in the growth of the business of the railways of England.

Such of our companies as are able to do so, are remedying these difficulties by all sorts of schemes and plans, that are probably the best possible under the circumstances, but not the best that might have been, had these necessities been understood in the early history of our railroads. We must look to the new roads for improvements in these particulars. They ought to take example from our trans-Atlantic cousins, and buy all the land they can get at the principal points on the lines of their roads, and keep it until the wants of their companies shall be determined, and for the large rise in

value and ready sale of the excess, if there should be any.

What our cotemporary says of the condition of Cincinnati in these particulars, and the advantage offered by the ample and well situated grounds in the East end of the city for such purposes, can not be gainsaid by any one. We have called attention to these things many times during the past ten years, apparently to little purpose, but the day is at hand when what was prediction will be fact, and, like many other things, when it is accomplished doubters will be convinced, whilst others will wonder why it was not all seen and seized long before. But such is the world.

The *Commoner* says:

"There is one general mistake made by all our railroad companies that is likely to prove not only embarrassing to them, but very expensive to remedy, and that is in not securing ground enough for their business. There is not one of these corporations with lines of road extending into any of our large business centers that has not been compelled already to use more than double the room for their depots, warehouses and yards than they originally expected to, and that are now so crowded and cluttered up that they can hardly move, and yet their business is increasing at an enormous rate, and will continue to do so for some years to come, until it will be quadruple what it is now, if it does not even reach far beyond that. So mistaken have been some of our most sagacious railroad men upon this subject that they have, in the early years of the enterprises under their management, sold off portions of the grounds that had been donated to their companies, or purchased at low rates, because a less amount than a small farm or a whole square could not be had, and have since been obliged to buy them back at enormously increased prices, and are still without the requisite room upon which to do the traffic of their roads with proper economy. This is not only true of yard and shop and depot grounds in our great cities, but it is equally so of most of the way stations on the lines of these roads. There are very few with room enough, and the companies are subject to all sorts of expensive annoyances because of these misfortunes.

So little did our people understand the effect these great improvements would have upon the commerce of the country that their most ardent advocates under estimated it. What was only fifteen years ago called wild and visionary concerning them, is now more than realized, has become practical, and we should not wonder if, by the close of the next decade, we should find that with all our experience we have again fallen considerably below the reality in our present estimates of the needs of these vast interests.

Our own city is an illustration of these facts. Every railroad running into this city finds that it needs double the room it can control to transact its business upon. From time to time depots have been extended, outlets inclosed, shops enlarged, buildings heightened, until every available spot is used to its utmost capacity, and all the planning and arranging that have yet been devised are insufficient to afford the requisite relief.

What is to be done for the future when the population of our city shall have a million or more, when this whole lower plain shall become the great workshop and mart of the

city, and the country and places tributary to it shall have doubled in population and quadrupled in the amount of their business? This is rather a serious question, yet it is one that is now staring us in the face, and must be met, and that, too, before long. It is likely that some of our companies will be buying back, at a large advance, the property they considered as burdensome a few years ago, and sold at a small price per acre, and that others will be forced to secure squares and blocks, at enormous cost, and forever be subject to the perplexity of crossing crowded streets and alleys.

And then, what are the new roads which are seeking this city, to do? There are upon this side of the river, at least, two companies who will some day want accommodations in our midst, and upon the other side, there is our great Southern road, an immense concern, that will require as much room as any one of the great lines in operation here unless it is to stop and distribute a large portion of its benefits in our sister State; besides, there is the Chesapeake & Ohio road, and the Kentucky & Great Eastern; both will want accommodation in or near the business part of our community. That, it seems to us, will be difficult, if not impossible, to obtain, and without which they will be subject to many disadvantages as competitors with the other lines.

In the West end all the ground that can be had for such purpose is already in the hands of the companies whose roads center there. There are parts of Mill creek bottom adjacent to some of these tracks that might be filled, and give a made ground extension, but this will be very expensive, and we believe of small extent, and reaching too far into the suburbs. In the East end the opportunity is yet open for pretty extensive grounds that are most favorably situated both in their relation to the business part of the city, and for the transaction of such heavy freight business as would be likely to be transported there. What fine coal yards could be made in some of those useless hollows that now gather the filth of the city and breed pestilence. How favorably could immense freight depots be located, where heavy wheels could be easily handled both from the cars and drays.

There is plenty of room there now for one or two railroads. In a few years this will be gone for other purposes unless some of our keen sighted, far seeing railroaders take it up. To command these grounds now, and to secure the building of the Walnut Hills tunnel is to get not only the best possessions and the most extensive of the sort now afforded by our over crowded city but, in our judgment, better than any now owned or occupied by the companies who had their pick and choice."

128 In Sheffield, the manufacture of Bessemer steel, railway material, armor plate, machinery, files, and various other articles in iron and steel, outranks the cutlery business, though the latter may well claim Sheffield as its home. Sheffield last year sent to the United States the following values: Of steel, \$2,870,000; railway material, \$1,141,000; cutlery, \$1,433,000; files \$173,000. The total value of exports was in round numbers, \$6,425,000.

129 Iron sponge, which is coming into important use as a disinfectant and powerful absorbent of noxious gases, also a filtering agent superior even, it is said, to animal charcoal, is manufactured by calcining a mixture of iron ore and charcoal finely pulverized.

Journal of Railroad Law.

RAILROAD COMPANIES—RULES IN DETAIL AS TO DELIVERY OF GOODS TO CONSIGNEES.

The facts in the late case of *Fenner vs The Buffalo and State Line Railroad Company* (41 N. Y., 505) are fully and clearly stated in the following opinion by—

EARL, C.—It is well settled in this State, that an intermediate carrier, one who receives goods to be transported over his route, and thence by other carriers to their place of destination, generally remains liable as a common carrier until he has delivered the goods to the next carrier. *Miller vs Steam Navigation Co.*, 10 N. Y., 431. It was deemed wise policy that the principles of the Common Law should be so expounded and applied, that the liability of one carrier should continue until that of the next carrier commenced. Chief Judge Johnson, in *Gould vs Chapin*, says: "No owner can be supposed to have an agent to superintend each transportation of his goods, in the course of a long line of transportation; and if the responsibility of each carrier is not continued until delivery in fact to the next carrier, or at least until the first carrier, by some act clearly indicating his purpose, terminates his relation as carrier, we shall greatly diminish the security and convenience of those whose property is necessarily abandoned to others, with no safeguards save those which the rules of law afford." In *McDonald vs The Western Railroad Corporation*, Judge Smith, speaking of the carriage of goods over successive lines, says: "The owner loses sight of his goods when he delivers them to the first carrier, and has no means of learning their whereabouts till he or the consignee is informed of their arrival at the place of destination. At each successive point of transfer from one carrier to another, they are liable to be placed in warehouses, there, perhaps, to be delayed by the accumulation of freight or other causes, and exposed to loss by fire or theft, without fault on the part of the carrier or his agents. Superadded to these risks, are the dangers of loss by collision, quite as imminent while the goods are thus stored at one point unknown to the owner as while they are in actual transit. As a general rule, the storing under such circumstances should be held to be a mere accessory to the transportation, and the goods should be under the protection of the rule which makes the carrier liable as an insurer, from the time the owner transfers their possession to the first carrier till they are delivered to him at the end of the route." I have extracted this much from the opinions of these learned judges to bring into view the grounds upon which the decisions were based, and to show that they apply only to intermediate carriers, and not to carriers who transport the goods to their final destination. That the principles laid down in these decisions should be thus limited, were held in the Court of Appeals, in the case of *Northrop vs Syracuse, B and N Y. R. Co.*, decided in 1867. In that case the defendant agreed to transport for the plaintiff a certain quantity of wheat from Tully, in the county of Onondaga, to Chenango Forks, and did so transport the same. The wheat was in bags, and was marked directed to the plaintiffs, at Chenango Forks, although they resided fifteen miles from there, at Chester village, where they intended to carry the wheat. No one being present for the plaintiffs to receive the wheat

on its arrival at Chenango Forks, it was deposited there in the freight house of the defendant, at four o'clock in the afternoon, August 8, 1859. The plaintiffs, on the afternoon of the next day, received notice that the wheat had been sent from Tully to Chenango Forks, and the following night the wheat was consumed by fire; and on the 10th of August the plaintiffs sent for and demanded the wheat. It was held that the defendant was not liable as a common carrier for the wheat, and that the plaintiffs could not recover. The rule was laid down in that case that when a railroad carrier safely transports goods to their place of destination, and, finding no one there to receive them, or to whom notice can be given of their arrival, places them in its freight house, and keeps them there uninjured for a reasonable time, ready for delivery, it ceases to be liable as a common carrier; and that it is not necessary for the carrier to give notice of the arrival of the goods to a consignee, who, as in that case, did not reside at, or in the immediate vicinity of, the place to which the goods were consigned.

The courts below de-lated the defendant in this case, upon the erroneous assumption that it was an intermediate carrier within the meaning of the cases first above cited, and hence that this case was controlled by the principles laid down in those cases. The contract of an intermediate carrier is to carry the goods to the end of his route, and there deliver them to the next carrier for further transportation. The contract of the final carrier is to transport the goods to their place of destination, and there deliver them to the consignee or owner; and such was the contract in this case.

Here the goods were consigned to F. P. Fenner, Dunkirk, and defendant undertook to carry them to Dunkirk, and there deliver them to the consignee, and had no duty whatever as to their further transportation. It was the duty of the plaintiff, or her consignee, to take the goods at Dunkirk, and see to, or arrange for their further transportation. The defendant, in this case, was no more an intermediate carrier than the defendant in the case of *Northrop vs Syracuse, B and N Y. R. Co.* The rule to be applied to the case, then, is the one that is applicable to carriers who carry goods to their final destination. This rule is not very definitely determined in this State. In Massachusetts, and some of the other States, it is settled that the moment a railroad carrier carries goods to their final destination, according to its contract, and deposits them in its freight house ready for delivery, its liability as carrier ceases, and it remains liable simply as a warehouseman; but this rule has not been adopted in this State, and should not be. It is not always, or generally, practicable for the consignee to be present, on the arrival of the goods, to receive them; and it is just as important that the carrier should continue to be liable, as an insurer of the goods, for a reasonable time after their arrival, until the consignee can have an opportunity to take charge of them, as that it should thus be liable during the transit of the goods to their place of destination.

At an early day, when all goods were carried on land in wagons, it was generally the duty of the carrier to deliver the goods to the consignee personally, or at his place of residence or business. This was so because the carrier could go anywhere with his wagons and make the delivery. But carriers upon water, as they were confined by their means of transportation to the water, were bound only to deliver their goods upon the wharf or pier,

and if the consignee was present, it was his duty at once to take charge of the goods. If he was not present, but lived at the place of destination, it was the duty of the carrier to give him notice of the arrival of the goods. If he was absent, dead, or could not be found, the carrier discharged his duty by depositing the goods in a warehouse, subject to the order of the consignee. It seems to me, that substantially the same rules, and for the same reasons, should be applied to a railroad carrier; it is obliged to stop at the depot as the water carrier is at the wharf, and unless the consignee is present on the arrival of the goods to take them from the cars, it must, as is the well known and uniform custom, place them in its freight house.

From the drift of this decision in this State, I think we may fairly infer the following rules as to the delivery of goods at their place of destination by railroad carrier: If the consignee is present upon the arrival of the goods he must take them without unreasonable delay. If he is not present, but lives at or in the immediate vicinity of the place of delivery, the carrier must notify him of the arrival of the goods, and then he has a reasonable time to take and remove them. If he is absent, unknown or can not be found, then the carrier can place the goods in its freight house, and, after keeping them a reasonable time, if the consignee does not call for them its liability as a common carrier ceases. If, after the arrival of the goods, the consignee has a reasonable opportunity to remove them, and does not, he can not hold the carrier as an insurer. The carrier's liability thus applied and limited I believe will be found consonant with public policy and sufficiently convenient and practicable. (Roth vs. Buffalo and State Line Railroad Company, 34 N. Y., 548).

Within these rules of law I think the defendant in this case was not liable for the loss of the goods in question. The teamster, Austen, was plaintiff's agent. He had notice of the arrival of the goods, and paid the freight and gave the defendant a receipt for them. Just at that time the railroad employe was engaged in delivering other freight, but there was no refusal to deliver these goods, and, so far as appears, no unwillingness to deliver them; and I think we are bound to infer, that if Austen had demanded the goods, they would have been delivered to him. It was getting late, and as Austen intended to return again the next day, for his convenience the goods were permitted to remain. I say a convenience. It matters not that it was a so for the convenience of the railroad employe, or for their mutual convenience. It is sufficient that Austen could have had the goods, and that they were left under an arrangement in which he participated, and to which he assented, as much for his convenience as for the convenience of the other party. Suppose the arrangement had been to leave the goods there for a week, or a month, for their mutual convenience, would the railroad company have remained liable as a common carrier? Here, then, there is a case where the consignee's agent had notice of the arrival of the goods, and had an opportunity to remove them, and he left them in the defendant's freight house because it was more convenient for him to call for them the next morning. Under such a state of facts, when the goods were thus left in the freight house for the mutual accommodation of both parties, should the law impose upon the one party the responsibility of an insurer? I think not, and that neither justice nor public policy require

that, upon the facts existing in this case, the defendant should be held liable as a common carrier.

I am therefore in favor of reversing the judgments and granting a new trial, costs to abide the event.

Ordered accordingly.

Bottling the Sun.

We clip from an exchange the following item, which, as evidencing the most blind and hopeless ignorance in scientific matters, we consider far in advance of any thing which it has ever been our misfortune to discover:

"'Bottling the sun' is the characteristic title given by its French discoverer to a curious process by which the heat of the sun can be fixed in a closed vessel so as to be used at will. A vase constructed for the purpose is exposed for a quarter of an hour to the action of the sun's rays, when it is hermetically sealed with a cork, through which a small hole has been drilled. Upon holding a powerful lens before this hole, and converging the imprisoned rays on the wick of a candle about a yard distant, the candle is lighted almost instantly. The discovery is certainly a most curious one, and may prove of great practical utility."

We warn our readers against placing any confidence in statements of novel discoveries where the name of the inventor or discoverer is omitted. The "French discoverer," the "German philosopher," belong to that irresponsible class called in newspaper parlance, during the late war, "reliable gentlemen," or "intelligent contrabands." As these last mentioned individuals were never known to utter a word of truth under any circumstances whatever, the amount of belief to be expended on the statements ascribed to the former wisacres should be in quantity infinitesimally small.

The details given in the above article strike us as most supremely though ingeniously ridiculous.

In the first place, we are told that the heat of the sun is all that is bottled, and consequently our fears as to what would become of the universe in case that valuable luminary itself were so disposed of, are at once dispelled. This heat then is condensed in the receptacle and there "hermetically sealed" by a cork through which a hole has been made. "Hermetically sealed" is good. We should like to know by what peculiar process a vessel is "hermetically sealed" by means of a cork with a hole in it. A powerful lens now makes its appearance and is held before the aforesaid hole; the imprisoned rays are thus converged, and a candle lighted. The action of a lens is to concentrate solar rays falling on its whole surface to a point called its focus, and when a candle wick is kept at this point it becomes ignited; but that this can take place by means of the heat coming through a little hole in the cork of a bottle is out and out nonsense. The only solar action which in a similar way may be stored up is a very small portion of light. The sulphides of calcium, strontium, and many other substances, when kept in really hermetically sealed, dry glass vessels, have, after having been exposed to the sun's rays, the property of being feebly luminous in the dark. This action has been very aptly compared with the resonance of a piano, which often continues several seconds after the hammers have struck the strings.

Light consisting of vibrations in the same manner as sound, the same laws prevail for both, even in many details, the only difference being that the vibrations of light are transverse and inconceivably fast, while those of sound are longitudinal and comparatively slower.

But, if the question be of really bottling up solar heat, nature continually affords us a striking example by the operation of vegetable growth. The trees of the forest, by the action of their leaves, decomposing the carbonic acid and depositing the carbon in the ligneous fiber, are continually storing away portions of solar heat which we may recover any time by igniting the wood. The ignition is really nothing but recombining the carbon with the oxygen, and returning it to the atmosphere, in the form of carbonic acid, from which it originally came, and at the same time evolving the heat which was stored up during its condition of carbon. In the same way we may regard all the coal deposits near the surface of the earth as so many storehouses of solar heat at our command at any time when we may need to make use of them.—*Manuf. & Builder.*

Baltimore & Ohio During 1871.

The resources of the company's lines amounted to \$12,557,529.42, as compared with \$10,840,370.48 during 1870—an increase of \$1,717,158.94. Of the total revenues there was derived from the main stem (including the Winchester and Potomac, Winchester and Strasburg, and Washington county branches), \$9,913,390.49; from the Washington branch, \$427,579.42; Parkersburg branch, \$733,095.34; Central Ohio division, \$946,246.15; Lake Erie division, \$513,768.57; and from the Wheeling, Pittsburg and Baltimore (formerly Hempfield road), from May 1 to Sept. 30, \$23,449.51.

The total operating expenses, including repairs of roads and machinery, amounted to \$5,907,887.68. The expenses thus amounted to 59.58-100 of the revenues, which shows the very material decrease of 5.12-100 as compared with 1870. While the revenues increased, as above stated, \$1,485,662.33, the entire working expenses increased \$453,427.68—making a comparative increase in the net profits of \$1,032,234.65. Compared with the fiscal year 1869, the increase of earnings being \$1,188,474.75, and of working expenses \$150,781.22—the increase of net profits amounts to \$1,037,693.53.

The sinking fund for the redemption of the city loan shows a gain of \$76,937.58, having increased to \$1,354,316.67. The redemption of the £800,000 sterling loan has amounted during the year to \$83,248, by the purchase in London of \$17,200 of the bonds. Dividends upon the capital stock have been declared during the year, payable October 31, 1870, and May 1, 1871, of 4 per cent. each; the company also paying the United States tax thereon. Compared with the statement of September 30, 1870, the liabilities have increased by the issue of 6 per cent. preferred stock (second series) amounting to \$131,400; and the profit and loss account shows an increase during 1871 of \$1,871,681.60, after deducting \$500,000 estimated losses on steamships.

The company has made in 1871, and anticipates during 1872, satisfactory progress in the construction of branches and extensions. The Pittsburg, Washington and Baltimore (formerly Pittsburg and Connellsville) road was opened in May last. Additional locomotives

tives and cars are being supplied in answer to largely increased and still increasing demands for rolling stock. President Garrett anticipates the full realization of the sanguine expectations entertained regarding the results of that important line. Arrangements are progressing for its extension through Pittsburgh to the great Northwest. It is expected that the construction of the Baltimore, Pittsburgh and Chicago Railroad, fraught as the enterprise will be with such vast advantages to all the extensive and varied interests with which it is to be connected, will be rapidly effected.

Minnesota Railway Business.

We gave, in our last issue, a statement of progress in railway building in Minnesota in 1871. From the official reports we learn the following concerning the operations of the roads of the State during the year, to Aug. 31:

St. Paul & Sioux City...	\$385,829 00
St. Paul & Chicago	39,149 00
St. Paul & Pacific—Branch line	285 396 93
“ “ Main line..	319,930 74
Southern Minnesota.....	468,895 07
Lake Superior & Mississippi	429,224 85
Minnesota Central	1,019,416 02
Hastings & Dacotah.....	17,744 65
Winona & St. Peter	464,797 87
Total.....	\$3,430,414 33

Of this, the receipts for passengers were \$1,067,095; for freight, \$1,112,028, and from other sources about \$250,000.

The average fare per mile for each passenger was 4 2-5 cents—being lowest on the Sioux City, 3½ cents, and highest on the short lines. The average rate of freight per mile was 3 3-10 cents per ton—the lowest being on the Lake Superior and Mississippi, which mainly carries a through rate, or 1 4-5 cents per ton per mile.

The amount of the municipal aid voted is as follows:

St. Paul & Sioux City ...	15,000	15,000
St. Paul & Chicago	404,000	200,000
Southern Minnesota.....	195,500	148,000
Minneapolis & St. L.....	368,000	.....
St. Paul & Dubuque.....	245,000	.....
Minn'a & N. Western ...	179,000	.....
L. Superior & Mississippi	350,000	.....
Winona & St. Peter.....	25,000	.....
Total.....	\$1,781,500	\$363,000

LOCOMOTIVE ALARM BELLS—A Michigan railroad company has attached to thirty-four of its locomotives a new style of alarm bell. The bell is so attached that when the engine goes the bell rings, being struck by the hammer once at each revolution of the driving wheels. Being placed directly in front of the boiler, the sound of the bell is seldom heard by the engineer or fireman on the engine, and can not be heard on the train; consequently, it is no annoyance to passengers, while it is claimed its position causes the sound to be thrown forward, and conducted by the earth and the railroad track or rails, so that it can be heard a considerable distance in advance of the train, thus giving timely warning. The general superintendent of the road thinks some recent accidents would have been certainly prevented by the use of this invention.

—Exchange.

The Rights of Commercial Agents.

The decision given at the December term of the United States Supreme Court of the decision of the court of appeals of the State of Maryland was in the case of the State of Maryland vs. Elias Ward, indicted and convicted of violating a law of the State of Maryland, prohibiting persons not permanent residents of that State from selling, offering or exposing for sale within certain cities and districts named, any goods whatsoever other than agricultural and those manufactured within the State, either by card sample, specimen, written or printed trade-list or catalogue, whether such person be the maker, manufacturer or not, without first obtaining a license to do so. Both residents and non-residents of that district are also forbidden to suffer or permit any person not a permanent resident of the State and not in their regular employment or service, to sell any goods in that way under their name or the name of the firm, or at their store, warehouse or place of business. Offenders against either of these prohibitions are made liable to indictment, and upon conviction may be fined not less than four hundred or more than six hundred dollars for each offence.

Ward, the defendant, is a citizen of New Jersey and not a permanent resident of Maryland, and the record shows that he, on the day therein named, at a place within the prohibited district, sold to the person therein named, "by specimen, to wit, by sample," certain goods other than agricultural products or articles manufactured in the State without first obtaining a license to do so, and that he was indicted for those acts in the proper criminal court, and was arraigned therein, and pleaded not guilty to the indictment. There being no dispute about the facts, the defendant was indicted, convicted and sentenced in the criminal court to pay a fine of four hundred dollars and costs. This decision was subsequently taken to the court of appeals of the State of Maryland by the defendant, and the decision of the criminal court affirmed. It was then removed to the Supreme Court of the United States, and the whole proceeding declared unconstitutional and void, and the cause remanded, with directions to the court below to conform its judgment to the opinion declared of the Supreme Court of the United States. From this brief history of the case our readers may easily understand the point decided and the effect of the decision.

The decision of Mr. Justice Clifford who gave the opinion of the court is elaborate and very long. He stated that the clause of the Constitution of the United States which the statute of Maryland directly and indirectly violated, rendering it, in either case, null and void, is "that the citizens of each State shall be entitled to all the privileges and immunities of citizens in the several States," under which the court decided that the clause "privileges and immunities" plainly and unmistakably secures and protects the right of a citizen of one State to pass into any other State of the Union for the purpose of engaging in lawful commerce, trade or business without molestation, to acquire personal property, to take and hold real estate, to maintain actions in the courts of the State, and to be exempt from any higher taxes or excises than are imposed by the State upon its own citizens. And, therefore, that the defendant in this case (Ward) might lawfully sell, or offer or expose for sale, within

the district described in the indictment, any goods which the permanent residents of the State might sell, or offer or expose for sale in that district, without being subjected to any higher tax or excise than that exacted by law of such permanent residents.

The court also said that the people of the several States live under one common Constitution, which was ordained to establish justice, and which, with the laws of Congress and the treaties made by the proper authority, is the supreme law of the land, and that that supreme law requires equality of burden and forbids discrimination in State taxation when the power is applied to citizens of other States. "Viewed in any light," says the justice, "the court is of the opinion that the statute in question imposes a discriminating tax upon all persons trading in the manner described in the district mentioned in the indictment, who are not permanent residents of the State, and that the statute is repugnant to the federal Constitution and invalid for that reason."

Mr. Justice Bradley also said in relation to the opinion of the court as given by Mr. Justice Clifford, that he concurred in the opinion of the court that the act of the Legislature of Maryland, complained of in this case, discriminates in favor of residents and against non-residents of the State, and consequently is in violation of the fourth article of the Constitution of the United States, and therefore, *pro tanto*, void; and also that the act is in violation of the commercial clause of the Constitution, which confers upon Congress the power to regulate commerce among the several States; and it would be so although it imposed upon residents the same burden for selling goods by sample as is imposed on non-residents. "Such a law would effectually prevent the manufacturers of the manufacturing States from selling goods in other States unless they established commercial houses therein or sold to resident merchants who choose to send them orders. It is, in fact, a duty upon importation from one State to another under the name of a tax."

This settles the legality of these late restrictive laws intended to shut out non-residents from an equal participation in the pursuit of legitimate branches of business. It can not be done. Many of the States have passed and heretofore have enforced such discriminating laws through criminal and civil prosecutions, all of which, by this decision, are rendered null and void. Citizens of any State may now, under the protection of the supreme law of the land, engage in any profession, business or occupation in any of the States of which they are not residents on the same terms as the citizens or residents of those States.

New York & Chicago National Railway.

Telegraphic dispatches from Washington refer to a scheme for a national highway between New York and Chicago, outlined by a bill introduced by a New York member of the House of Representatives. The capital of the corporation is fixed at one hundred millions of dollars. The company is to be organized and the surveys completed in one year from the enactment of the law, and the road is to be an air line from the southern extremity of Lake Michigan to its eastern terminus near the city of New York. The length of the route is not to exceed 750 miles, and the

company is authorized to construct three tracks—two for freight and one for passengers—to be laid of steel-headed rails weighing sixty-two pounds to the linear yard, the whole to be completed within eight years. Permission is also given to double the passenger track over a part or the whole of its length. The company also has authority to lease or purchase any road along its line, provided the whole length of the route is not extended beyond 750 miles, and the stock thus added does not exceed one hundred millions of dollars. All the purchased and leased roads are to have three tracks and the easiest grades and curves. The company is also authorized to issue first mortgage convertible bonds bearing seven per cent interest, which are not to be sold less than par, and whose holders are to have the rights of stockholders in the corporation. The road is to be a public highway, not subject to interferences from State Legislatures, either in relation to its fares, charges, time, speed of trains, or other matters connected with its operations, and the United States courts are given jurisdiction of all matters pertaining to the company. The act also requires that they shall run at least one train daily each way between New York and Chicago, in not more than eighteen hours, and carrying at least six tons of mail matter. The company are permitted to charge three cents per mile for fare, and $\frac{1}{2}$ cent per mile additional for palace and sleeping cars, two cents per mile for products of the soil, forest or mines, and not more than three cents per mile for other freight which can be loaded. Branches may be built to Cleveland, Toledo, or any other city within fifty miles of the main line.

Railroad Law.

RECENT DECISIONS.

Contract between a railroad company and a passenger.—Right of conductor to put off a passenger refusing to pay fare.—Agency.—M., on the first of May, purchased a through ticket from New York to Baltimore, over the P., W. & B. R. R., and on that day took the through train. The conductor took up the ticket, and gave M. a "conductor's check" with the words, "good for this day and train only," and with the numerals 5 and 1 showing the month and day, punched out of the check. M., desiring to leave the train at a way station, inquired of some one at the window of the company's ticket office at the station, if the check would take him to Baltimore on another day and train, and was told that it was "good until taken up." On the 6th of May, M. entered another train going to Baltimore, and being called upon for his ticket, offered the check. The conductor refused to receive the check, and M. having refused to pay his fare, the train was stopped at a point intermediate between two stations, and by direction of the conductor, M. left the train.

Held—1. That M. had no right to leave the train at the way station, and afterward to enter another train and proceed to his original point of destination, without procuring another ticket or paying his fare.

2. That on the refusal of M. to pay his fare the conductor had the right to put him off the train, using no more force than was necessary to effect his removal, and was under no obligation to put him off at a station.

3. That even if the person by whom M. was told that the check was good until taken up, was an agent of the company, the presumption is that a ticket agent at a way station has no authority to change or modify contracts between the company and through passengers, and that the *onus* of rebutting this presumption rested on M.—[*McClure vs. The P., W. & B. R. R. Co.*; 34 Maryland.

Carrier.—Railways.—1. The obligations and liabilities of a common carrier are not dependent upon contract, though they may be modified and limited by contract; they are imposed by the law from the public nature of his employment.—[*Hannibal R. R. Co., vs. Swift*.

2. If a common carrier of passengers, and of goods and merchandise, have reasonable ground for refusing to receive and carry persons applying for passage, and their baggage and other property, he is bound to insist at the time upon such ground, if desirous of avoiding responsibility. If not thus insisting, he receives the passengers and their baggage and other property, his liability is the same as though no ground for refusal existed.—[*Ibid*.

3. The liability of a common carrier of goods and merchandise attaches when the property passes (with his assent) into his possession, and is not affected by the carriage in which it is transported, or the fact that the carriage is loaded by the owner. The common carrier is an insurer of the property carried, and upon him the duty rests to see that the packing and conveyance are such as to secure its safety.—[*Ibid*.

4. It is not a ground for limiting the responsibility of a common carrier, when no interference is attempted with his control of the property, if the owner accompanies it and keeps a watchful lookout for its safety.—[*Ibid*.

5. Where a railroad company receives for transportation, in cars which accompany its passenger trains, property of a passenger other than his baggage, in relation to which no fraud or concealment is practiced or attempted upon its employees, it assumes with reference to the property the liability of a common carrier of merchandise.—[*Ibid* 12 Wallace.

—The San Francisco *Herald* insists upon more railroads across the continent, and says the delays and disappointments caused by the irregularities of the Union Pacific Railroad, and the immense amounts of freight that have failed to reach their destinations suggest the positive necessity for additional facilities between the Pacific and Atlantic States. Merchandise ordered from New York and other Eastern cities has been on its way here for more than sixty days, and no account can be obtained about the whereabouts of much of it. Goods intended for the holidays, and available only at this season of the year, have failed to make their appearance in time, causing severe loss to parties in that trade. Others suitable to the rainy season, and now marketable, are passing the winter somewhere between this city and an unknown easterly point. Trains snowed in, or blocked at the Missouri crossing; the unusual press of requirements for Chicago, and the damages inflicted by severe storms, have badly interfered with the regular working of the road; but they serve to prove that business is increasing so fast that we must have more roads.

WROUGHT IRON TIES—The rapidity with which wooden ties are destroyed in India by the action of the climate and white ants, has induced railroad men in England to look for a material which will prove more durable in tropical climates. This has led to the invention of an iron tie, which is described in the following language:

The new sleeper is made up of a number of webs and plates of rolled iron, riveted together, and pierced with bolt holes for the chairs. This is estimated to save about two-thirds of the labor of laying, and leaves but little work to be done by native or other labor. The direct cost is found to be not more than one shilling each above that of the best wooden sleeper, and they are calculated to last ten times as long in tropical countries, and three times as long in Europe. Many eminent engineers and railway constructors, who have examined these sleepers, express great confidence in their superior adaptation.

One of the pioneer tobacco raisers in Santa Clara county, Cal., had this year 20 acres of rich bottom lands devoted to "Havana" and "Connecticut Seed Leaf," the latter yielding 2,000 pounds per acre. He is his own manufacturer, employs eight hands and turns out "smoking" and cigars.

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No. 167 Walnut Street, Cincinnati, Ohio.

The Railroad Record.

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A. J. HODDER, - - - - -

CINCINNATI, THURSDAY, FEBRUARY 8, 1872

The Railroad Record,

PUBLISHED EVERY THURSDAY MORNING,

By Wrightson & Co.,

OFFICE—No. 167 Walnut Street

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A Glance at the South Atlantic States and their Relation to Cincinnati.

A telegraphic dispatch says that the Cincinnati Southern road has passed the Kentucky Legislature. If this be so, then a new field is open to Cincinnati commerce and manufactures. But, in the beginning of this new enterprise, it is necessary to understand the exact relation which Cincinnati now bears to the South Atlantic, and from that infer what is necessary to be done. I may premise what I am sorry to say, that the Pennsylvania Railroad Company and Louisville together, have already anticipated much that Cincinnati might have done, if the Southern road had been begun three years ago. The Pennsylvania company have leased or secured a large part of the Southern lines, with which the Cincinnati road must connect. Of course, they will discriminate against Cincinnati when they can. Again, Louisville has carried her line to the South nearly to the Cumberland Gap, where it will connect with the South-west Virginia line at Bristol. Thus you see Louisville has already nearly gained all she can. But, there is one thing in which Cincinnati has a great advantage, and always must have. This is a superiority in manufactures. This superiority she gained by elements which can not be overcome. She has gained it by position, materials and skill; all of which are in her favor. It is her manufactures, therefore, which will gain most by the the Southern trade. Now let us look at present condition of affairs.

1. Cincinnati is now, in the region extending from Macon to Charlotte, in the greater part of Georgia and South Carolina, literally “ignored.” They hardly know that Cincinnati exists. I asked in Augusta, Ga., where their stoves came from? “Most of them from Troy, N. Y., and some from Baltimore.” I asked, in Aiken, what is the price of flour? “\$12 per barrel.” “Where do you get it from?” “St. Louis.” I asked a man selling groceries, “where do you get your goods?” “New York; we buy all our goods in New York. They are brought through Charleston.” Thus you see that Cincinnati is in this region ignored. It is not Louisville, but New York and Philadelphia which are your rivals here.

2. The cause of this is not that there is no railroad from Cincinnati to Augusta, for there is, but because that road is 200 miles longer than it need be, and goes at only half speed. Then the goods and manufactures shipped at New York by steamship to Charleston can be transported to this country at much cheaper rates, and this will continue to be the case so long as the high rate of freight continues from Cincinnati to Augusta or Charleston.

3. Another thing to be looked at is, supposing we can do what we desire, and cheapen freights from Cincinnati to Augusta one-half, what would be the practical consequences? Practically, it would cheapen here all articles which can be made or produced in the Ohio valley one-third at least. The result of that we all know; the consumption of Western products, particularly those from Cincinnati, on this would be increased tenfold; for not only would the amount consumed be greater, but the larger part of these products would come from Cincinnati.

Now, after looking at this present condition of things, let us see what may be done, and what may be expected from the result

1. What is the condition and prospects of the country to which the Southern Railroad, if made, goes? The city of Cincinnati has fixed the southern point of the Cincinnati road at Chattanooga, and I suppose that is irrevocable. Assuming this, what part of the Southern country is reached? This will be Alabama, Georgia and South Carolina. In consequence of not going to Knoxville, the western part of North Carolina and East Tennessee, which ought to have been reached, may and will go to Louisville, which, as I have said, is fast completing the road to Cumberland, there to connect with another of the Pennsylvania arrangements at Bristol. This leaves South Carolina, Georgia and Alabama as the only field of the Southern road. Let us look at the statistics of these States:

	Sq. miles.	Population.	Present value of products.
S. Carolina	24,500	704,606	\$75,000,000
Georgia	58,000	1,184,109	125,000,000
Alabama ...	50,722	996,992	140,000,000
Totals...	133,222	2,886,707	\$340,000,000

We have here the elements from which we may gather the value of the Southern trade of Cincinnati with these States. As three-fourths of the whole products of these States is cotton, we may fairly estimate at least \$200,000,000 must be employed in these States to purchase things which they do not themselves produce. Of this, we put down \$50,000,000 as paid for articles produced in foreign countries. We have then \$150,000,000 in those States to purchase the products (grain, provisions and manufactures) of this country. If the Southern road be made, this vast sum in annual trade is what Cincinnati has to compete for. I hazard nothing in saying that \$100,000,000 per annum, if the Southern road be made, can be had for Cincinnati (of which she has now very little), under certain conditions, and not much without those conditions. What are they?

1. She must have the Southern road direct to the heart of this country, which we call, for example, Augusta, and Atlanta in Georgia. But, as Cincinnati makes the road only to Chattanooga, she does not command the roads south of it. If these roads are in the hands of rival cities and corporations, it is obvious, that even at the distance of 300 miles from Cincinnati very unfavorable discriminations may be made against Cincinnati merchants and producers. The people in these Southern States will not make these discriminations, for they are the consumers and want things cheap; but the railroads of these Southern States are not likely to be much longer in their own hands. Already two or three of their main lines are leased to the Pennsylvania company. The object, as I have before stated, is not merely profit to the Pennsylvania company, but *gain this very trade to Philadelphia*. At present, New York is the main holder of the Southern trade, and Cincinnati has comparatively none at all. There is, therefore, a second condition necessary to Cincinnati.

2. This is, that in some way, by lease or contract, we should make arrangements with roads leading into Alabama and Georgia. I hazard nothing in predicting that in two or three years hence the Pennsylvania company, controlling Southern roads, will discriminate on those roads against the products, especially of manufactures, from Cincinnati. You may say this is very uncharitable. What reason have you for saying that? Trade is never charitable, and I say it because Philadelphia is a manufacturing city, and the very object of these leases by the Philadelphia company is to do that very thing. Now, there is another condition, and that will go far to obviate the difficulty suggested above.

3. That the Cincinnati Southern road, and all roads it connects with, should be run at the same rate as railroads are run in Ohio and Pennsylvania, that is, an average of 30 miles per hour for express trains, and corre-

sponding rates for freight trains. You must put on an express train from Cincinnati to Augusta, Ga., in 20 hours; and when you do that you will have the Southern trade, and fear neither New York or Philadelphia.

These are the conditions, and if you comply with them you will have the Southern trade; and without them, not. You may make the Southern road to Chattanooga, and gain very little by it. I advise you of this in time. But you may, with proper arrangements, secure a trade with the South of \$100,000,000 per annum. Do it, by wise and timely energy.

E. D. M.

AIKEN, S. C., Feb 1, 1872.

Ohio & Kentucky.

We are pleased to see that the Ohio & Kentucky Railroad Company have filed their certificate of incorporation with the Secretary of the State of Ohio.

The termini of this road are Maysville, Kentucky, a town of considerable importance and chock full of enterprise; and Lancaster, Ohio, on the line of the Pennsylvania Central Railroad, in its route from Cincinnati to New York.

The route will be through the counties of Brown, Adams, Highland, Pike, Ross, Pickaway and part of Fairfield. All good counties, and capable of assisting to make a railroad and sustaining it when made.

The principal incorporators are Gen'l Thos. Ewing, and Charles Roland, Esq., and the capital stock is fixed at \$2,000,000.

This is a good line of road, both locally and as a link in a through line from the East to the South-west.

At Maysville it will connect with the northern division of the Maysville & Lexington road, now about completed to Paris, where it connects with the Kentucky Central. From this point other lines are in contemplation that will sooner or later be completed and extend into the most productive region of the South, and make connections with other lines that reach the ports upon the Gulf.

This scheme is a meritorious one and in good hands. We wish it the highest success.

Chicago Railway Review.

This popular and able journal comes to us changed from a folio to a quarto form, and in an entirely new dress.

It was always a tip-top railroad paper, and now has the attraction of being one of the most elegantly gotten up publications in the country.

Mr. Brooks, the old stand-by of the concern, has associated with him Mr. A. S. Higgins, a gentleman of ability, and who will add force and popularity to this deserving paper.

We wish it the greatest prosperity.

Cincinnati, Rockport & South-western Railway.

President Kirby has been kind enough to send us a copy of his report upon this important work, which we have examined with care and satisfaction, and from which we make the following extracts.

He says:

The entire cost of construction and equipment of the line from Rockport to Mitchell, after adding \$58,000 to the estimate of the Engineer for contingencies, was \$2,231,875 77
The assets, after deducting \$38,626 46 for probable shrinkage, for collection, etc., were 434,695 33

Leaving total cash to be provided \$1,797,180 44

To realize this amount in cash and provide for the first year's interest on the bonds, it would require the sale of bonds (at eighty-five cents on the dollar) to the amount of \$2,312,569 33

The interest on this sum at 8 per cent. would be \$185,005 54
The estimated net earnings of this line were set down at 157,500 09

Showing an annual deficit to pay interest on bonds alone of \$27,505 54

It was clear from this showing that the company would not be able to build and equip the line, from Rockport to Mitchell, without a very material increase of original capital; for the probable net earnings being much below the sum necessary to pay the interest on bonds, made it quite certain that bonds could not be negotiated at the figure mentioned, and quite as certain that if negotiated at higher rates the company must become insolvent soon after if not before the road could be completed and ready for business.

With a view of making it entirely practicable for this company to adopt the Mitchell line, a consolidation was made in accordance with the laws of Indiana, in such case made and provided, between the Rockport & Northern Central Railway and the Cincinnati & South-western Railway Company, uniting the interest of both in one company, under the name of the "Cincinnati, Rockport & South-western Railway Company," thus embracing two lines—one from Mitchell to Mt. Vernon, via Jasper, and the other from Jasper to Rockport.

This is a frank and intelligent statement and shows that Mr. Kirby would not rush into the work and involve his company in costs and experiences, and trust to mere fortune to extricate itself, a plan too often adopted by railroad managers, and that is frequently the beginning of troubles that follow valuable enterprises through many of the early years of their existence, and finally financially break them down.

Mr. K. calls attention to the original idea of the scheme; he says:

It will be remembered in this connection, that the first move of the friends of this road was made with a view of running it from

Rockport to Loogootee, at a probable cost of \$1,500,000; but, for reasons well understood, and I doubt not quite satisfactory to all parties interested, it has been determined by the company to embrace the cities of Mitchell and Mt. Vernon in the enterprise. This change necessarily involves a much larger outlay of money, which increases the estimated cost of the work, in round numbers, from \$1,500,000 to \$3,705,000; but this increased cost, however large it may seem, is not to be considered for a moment in comparison with the extraordinary advantages to be gained, as the line from Rockport to Loogootee would of necessity be exclusively local, while the addition of Mitchell and Mt. Vernon open up in connection with the Ohio & Mississippi road two trunk lines from Cincinnati to the lower Ohio at Rockport and Mt. Vernon, and form connections with important roads as well as the river at both of these points.

But while the addition of the Mt. Vernon line (72 miles) to the original undertaking from Mitchell or Loogootee to Rockport presents new and great advantages, it also involves the necessity of new efforts on the part of the stockholders in raising the capital stock of the company to a sum that shall prove an ample basis for the issue of bonds and the negotiation of the same on reasonable terms.

The cost of the work thus extended, and an estimate of the earnings of the road, are given in the following statement:

From Mitchell to Jasper, 39 miles \$1,242,890
From Jasper to Rockport, 36 miles 617,698
From Jasper to Mt. Vernon, 72 miles 1,314,828

Making total \$3,175,416

ROLLING STOCK.

18 locomotives \$180,000
11 coaches 55,000
5 baggage cars 7,500
450 flat and box cars 270,000
Hand cars 2,000
Telegraph 15,000
529,500

Total cost of both branches including everything ready for business \$3,704,916

Or 147 miles of road at \$25,203 57 per mile.

The cost of preparing the road bed of the several lines ready for the iron, estimated at prices of present contract, will be:

From Mitchell to Jasper \$700,000
From Jasper to Mt. Vernon 430,000
From Jasper to Rockport 213,000

Total \$1,343,000
Making per mile \$9,047 67.

The means of the company are shown to be:

The present assets of the company equal to cash on hand are \$434,000
The amount to be donated on Mt. Vernon line (Engineer's report) 370,000
Amount anticipated by donations and subscriptions 100,000

Total \$904,000

This sum deducted from total cost of the road and equipment leaves \$2,800,916 to be raised during the progress of the work, which, if raised in bonds at 85 cents on the dollar, would make a bonded debt of \$3,295,195 29.

Adopting the rule of estimating the probable earnings and expenses followed in former estimates, and adding a small sum per mile for increase of earnings from Jasper to Mitchell in consequence of the Mt. Vernon Branch, the earnings of the entire road, 147 miles, would be

Gross expense \$808,500

Net earnings..... \$323,400

Amount necessary to pay interest on bonds 263,615

Surplus to pay interest on stock \$58,785

The receipts are estimated:

Gross earnings per mile\$8,788

Net earnings at thirty two per cent..... 2,812

For safety in the computation, Mr. Kirby makes the following exhibit:

From Jasper to Mitchell, 38 miles, at \$8,788 per mile.....\$333,944

From Jasper to Rockport and from Jasper to Mt. Vernon, 109 miles, at \$6,100 per mile 664,900

Total\$998,844

Net earnings at 32 per cent.....\$319,600

Amount necessary to pay interest on bonds 263,615

Surplus to pay interest on stock \$55,985

And for a second and more detailed statement of the earnings of the road and its surplus, he sets out in his report this tabulated calculation:

147 miles at \$3,500 per mile..... \$514,500 00

2d year at \$4,700 690,900 00

3d year at \$6,100 896,700 00

Total for 3 years\$2,102,100 00

Total net earnings for 3 years at 42 per cent..... \$882,882 00

Total interest on bonds first 3 years 790,846 86

Surplus on the first 3 years' earnings..... \$92,035 14

I have not put down the anticipated earnings of your road at the above figures because I have the slightest doubt that the country will not furnish at the start a much larger amount, for I believe that in less than three years after the road shall have been completed, the gross earnings will exceed \$7,000 per mile. There is no section of the State of Indiana, embracing so large an area of territory as the several counties through which this road is designed to run, that possesses such great natural and industrial resources.

So much for the report thus far. It is all reasonable, and such as will be approved by any railroad man in the country.

Mr. Kirby then comments upon the future venue of this important road, and refers to the "block coal" that lies near the line of his road, and that is so vital to the prosperity of our city.

Mr. Kirby says:

But looking to a larger and more constant source of revenue, I have had a map prepared, under the special supervision of the General Superintendent, Dr. E. H. Sabin, with a view of having the State Geologist, Prof. Cox, of Indiana, mark out on it the coal fields of this

part of the State. It will be seen by reference to this map, herewith submitted, as marked and lettered by him, that almost the entire face of the country traversed by your road has unmistakable evidences of an immense coal field, which is only to be worked to be made profitable and abundantly reward the laborer for his industry, as well as to yield a never-ending business to the road. But the most interesting feature of this subject, and the one to which I desire to call your special attention, is that both lines from Mitchell to Rockport, and from Jasper to Mt. Vernon, run over and within convenient working distance of the most extensive deposits of the celebrated "Indiana block coal," of which Professor Cox says, in a letter to the General Superintendent of your road:

"You are probably aware that the block coal of Indiana is the most valuable fuel in the world for manufacturing iron and steel. For locomotive use, and for all other purposes except the manufacture of gas, it is likewise unequalled. The block coal of this State is attracting more attention at this time than any other mineral in the United States."

In addition to this, there are other varieties of coal in great abundance near this road, and heavy deposits of iron ore, and a most superior quality of lime and grit stone, that must add largely to the freight business of the line, and prove of immense profit to the company.

Referring to the connections of this road, the report says:

The Mt. Vernon line makes connections at the city of Mt. Vernon with the St. Louis & South-Eastern Road from St. Louis to Evansville, and with a direct line now in course of construction from Mt. Vernon to Cairo, Illinois, and with projected roads to Princeton, Kentucky, and the Elizabethtown & Paducah Railroad, forming a connecting link between the north-eastern and south-western sections of the country, making a line to Memphis, Tenn., over forty miles shorter than any now existing, as well as tapping and crossing the New Albany & St. Louis Air Line and the Evansville & Crawfordville Railroads in its course, thus giving to your road a through traffic that now goes to other more remote markets for want of short and direct railway connections, while the Rockport branch, running from Mitchell to Rockport, touching in its course French Lick Springs, (already a great summer resort), Jasper, Huntingburgh, Lincoln Farm, and connecting with the Owensboro & Russellville Road, securing to your road a large passenger and freight traffic from the Green river country, the best and wealthiest portion of the State of Kentucky, and forms a connecting link on a direct line between the northern and southern system of railroads, making a trunk line to Nashville with much easier grades than any road now built or contemplated, with distance from Cincinnati to that point but thirty-nine miles further than the most direct route yet established, which is more than overcome by the light grades, which must insure the road a through business of great value.

President Kirby then, in a most clear and convincing paragraph or two, discusses the policy of building roads with a limited amount of stock and a large issue of bonds sold at heavy discounts, against the opposite plan of having a larger basis, and therefore better credit, and a larger price for the company's securities. He sums up as follows:

Suppose, for example, that by adding \$450,000 in stock to your present assets you raise your capital to the sum of \$1,354,000, a sum more than equal to one third the entire cost of the road and equipment, you would then have to borrow, in round numbers, but \$2,346,000, or in bonds at eighty-five cents on the dollar, \$2,760,000. The interest on this sum would be \$220,800.

The net earnings of the road being..\$319,600 Which after deducting int on bonds.. 220,800 would leave a balance for interest on \$650,000 stock, of \$98,800, a sum equal to fifteen and two-tenths per cent., besides greatly enhancing the value of your bonds.

Then says Mr. Kirby:

Believing it to be the true policy of this company to add to its capital stock at least \$450,000, I recommend the following plan which, if adopted and carried out, would secure the speedy completion of the work:

First. To take subscriptions to capital stock to an amount not exceeding \$500,000, to be paid in monthly installments of five per cent. This new stock, however, should pay up back installments in order to make it equal to the original stock, and then all stock should be collected in installments of five per cent. per month.

Second. To issue bonds not to exceed \$20,000 per mile. The assessment on stock would place in your possession a cash capital in round numbers of \$35,000 per month, to be applied to the construction of the road, until such sum of bonds could be sold as might be necessary for a more rapid prosecution of the work.

I have shown from the best data I could obtain that this company, if properly conducted, as I have no doubt it will be from the high business reputation of its stockholders and the representatives they shall from time to time select as officers and directors, must prove a good paying investment, but the addition of \$500,000 of stock to be raised in this community, raises the inquiry as to what interest the general public has in the enterprise and to what extent every citizen of Cincinnati ought to be willing to assist us.

No fact is more deeply impressed upon the minds of our business men than that we are sadly deficient in railroad facilities to reach the best markets for all we have to dispose of, and in return for all we need to buy.

The Southern system of roads tapped, manipulated and operated for the benefit of great competing manufacturing and mercantile cities of the East, and the great northern system being constantly operated against our interest, shows but too plainly that Cincinnati must have a railroad policy and have it at once, and I do not doubt that when the appeal is properly made all intelligent business men will lend us a helping hand.

Yes, "Cincinnati must have a railroad policy," but whether she will have it at once admits of some question. For many years other men who had the interests of Cincinnati deeply at heart, hammered away and urged the city to define her railroad policy but she would not. It may be that the time has come when she will, that Mr. Kirby is the man to finally arouse her to the importance of making the effort, at least, and that the movement will be inaugurated by her business men promptly responding to President Kirby's call, and lending a helping hand to complete the work he has so auspiciously begun.

The Babcock Extinguisher.**A DESERVED TRIBUTE.**

(From the Chicago Tribune, Nov. 23, 1871.)

The following letter from Robert F. Lincoln, son of the late President Lincoln, is another deserved tribute to the value of the Babcock Extinguisher.

F. W. FARWELL, Sec'y Babcock Extinguisher Company,

My Dear Sir:—My house caught fire to-day in the partitions over and around the furnace, and when discovered was burning in several places on each floor, threatening the destruction of the building. Fortunately, help came in the shape of your Babcock Extinguishers, and, although the fire was very difficult to get at, was speedily subdued, with no damage except the necessary breakage of walls between three floors. Had the fire been put out with the ordinary fire engines, my building, furniture, library and paintings would have been flooded with water, causing damage to the extent of many thousand dollars. I am exceedingly grateful for this generous and timely use of the machines, and feel I owe to them the safety of my house and furniture. One of the Extinguishers left here I desire to purchase.

Very truly yours,

ROBERT T. LINCOLN.

CHICAGO, NOV. 25, 1872.

Church's Musical Visitor for February has reached our table, and is certainly the best and handsomest number yet issued of this valuable art journal. The frontispiece is adorned by a *full page* portrait of Christina Nilsson. Correspondence from New York, Boston, St. Louis, Chicago, Indianapolis, and New Orleans; able editorials. The departments of musical, dramatic, and art news fresh and full. Its musical contents embrace "White sails waft me away," a beautiful ballad written by the authoress of "Leaf by leaf the roses fall," Chopin's beautiful waltz, Op. 64, No. 2, and the "Overture Medley." Terms, one dollar per annum. John Church & Co., No. 66 West Fourth street, Cincinnati, O.

Four cities, New York, Boston, Hartford and Providence owe Chicago a total insurance of about \$23,000,000. Of this New York owes \$13,000,000; Boston, \$2,750,000; Hartford, \$5,000,000, and Providence a little over \$2,000,000. In proportion to the risks and the amount of capital invested, the Hartford companies, next to those of Chicago, were the heaviest losers. It is not supposed that the defaulting companies will be able to pay an average of over 30 per cent. to insurers, and some of them have already compromised at 25 per cent.

A canal is projected to connect the Danube with a stream flowing into the North sea. Whereat a New York paper boils over with enthusiasm for the future, and predicts that this canal will become a highway for vessels loaded with grain, from Lake Superior, through Europe into the Black sea. Great are canals.

Krupp's Works at Essen.

We find in a late number of *The Engineering and Mining Journal* the following abstract of a paper read before the American Institute of Mining Engineers, by Prof. Thos. Eggleston, of Columbia College School of Mines, New York:

The celebrated steel works of F. Krupp, at Essen, in Germany, cover about one square mile, one-fourth of which space is under cover. Mr. Krupp employs 10,000 workmen, 8,000 in the steel works and the rest in mines and blast furnaces. Nothing but steel is made at Essen. The product in 1866 was 61,500 tons of cast steel. The cementation process is used to make steel for fine tools, but for all other purposes the Bessemer and puddling processes are employed. Ten or twelve ton ingots of cast steel, usually considered very large, are trifles here. Krupp has cast 40 tons in one ingot. The great abundance and ingenious arrangement of steam cranes overcome the difficulty of handling such large masses.

The puddled steel is melted in the crucibles with iron made from peculiar ores, to obtain an adequate supply of which mines and furnaces have been bought in all parts of Germany. The crucibles are made by machinery, and never used more than once. In the tempering house, 100,000 of these are always on hand, in sizes to contain 20, 30 or 40 kilograms. Each furnace will receive 4, 8 or 12 crucibles; and the casting house may contain at one time 1,200 crucibles in furnaces. The molds are all circular, for 60 lb. to 40 ton castings, and all served with steam cranes.

The operation of making a heavy cast is carried on with military precision, generally by signals. The place for the mold is selected and the canals are placed. At the first signal the furnaces are uncovered and the coal is taken out. At another signal, two men at each furnace seize a crucible with tongs, hook it to a bar, by which it is lifted out and set down in front of the furnace; another pair of workmen seize it and carry it horizontally to the troughs. The workmen arrive in such rapid and precise succession that as they pour the molten steel into the troughs it constitutes a continuous stream. The troughs end in a basin of reception. This work requires much nerve and a high degree of discipline in the execution of the maneuvers. Out of 100 picked men promoted to it, 40 give it up as too much for them. Castings are always made in the morning. The ingots are not allowed to cool, but stored in stalls and covered with fine coal. There was, at the time of my visit, \$800,000 worth of steel in ingots, more or less worked, thus stored.

The works contain over 50 steam hammers, from 120 lbs weight up to 50 tons; there are several of 25 and 15 tons. The great 50 ton hammer is the largest in the world; it cost \$580,000. The foundations are 100 feet deep in three parts, of masonry, large oak trunks and iron cylinders, bolted together. The anvil and frame rest on these, the rest of the hammer having separate foundations, to save the jar. The anvil is occasionally changed or broken. The frame is of cast iron, 8 inches thick, 6 feet in diameter, 5 meters high and 7 meters wide, forming an arch above and below. An opening 1 meter in diameter leads to a staircase, by which the foundations may be visited and inspected. The engine is supported by columns on the separate, surrounding foundation. The hammer head is 3.7 meters long, 1.59 meters wide and 1.25 meters

thick—making 7.5 cubic meters, and weighing a little over 50 tons. The stroke is 3 meters. The lower part is cast steel, the upper part cast iron, poured upon the molten steel. The diameter of the steam cylinder is 1.80 meters. Everything is kept in duplicate or triplicate, to prevent detention from breakages. The head once cracked in the upper part: and the anvil frequently breaks. Four cranes, each capable of bearing 200 tons, at the four corners of the hammer, serve it with the red-hot masses. Krupp intends to build a hammer of 100 tons!

Before each of these cranes is a reheating furnace. These are made with hearths on wheels, so that the heavy ingots can be trundled out, the side being partly torn away for that purpose. A 40 ton ingot, for instance, is moved by chains and long rods, it being impossible to approach it nearer than six feet. All the buildings about the hammer are made extra strong. Whatever else is going on, the hammer is heard over all.

In making tires, a six ton ingot is cut lengthwise, then across, flattened, punched in the center, hammered round on the nose of the anvil, and turned in an ordinary tire mill or Ramsbottom machine. They weigh 140 to 400 lbs., and are guaranteed to run 120,000 kilometers, or about 64,000 miles. One of these tires ran 46,000 miles before being turned off the first time. Pump rods have been turned here 65 feet long, in one piece.

There are several cupolas in the works capable of melting 50 tons at once. A cast iron block weighing 250 tons was made from four cupolas in eight hours.

Krupp's Bessemer department is not shown to anybody. The number of converters is variously stated. It may be eight or twelve. They are in a straight line, and served with steam cranes.

Of the remarkable excellence of Krupp's cast steel nothing need be said.

THE MASSACHUSETTS RAILROADS.—The forthcoming report of the Railroad Commission, as quoted in the New York *Financial Chronicle*, will show a list of more than 50 railroad companies in Massachusetts, whose aggregate lines, when completed, will be 1,422 miles long. About 50 miles seem to be now unfinished, leaving the actual length of roads in operation some 1,375 miles, or about 100 miles more than in 1870. The capital paid in of all these roads is \$75,250,000, against \$70,000,000 a year ago; their debts are \$22,374,748, against \$19,493,026 in 1870; the actual cost of roads and their equipment has been \$92,112,961, an increase of \$6,500,000 a year. The gross income reported is \$27,169,027, the working expenses \$19,350,070, and the net income \$7,743,905, against \$5,327,122, for ten months in 1870. The net income, this year, is about 9 per cent. on the reported cost of the lines. The surplus funds reported now are \$9,319,258, against \$7,230,310 in 1870—a gain of more than two millions, or nearly 30 per cent. in a single year. Seven of the roads declare dividends of 10 per cent., eight of 8 per cent., six of 6 per cent., eight of less than 6 per cent., and about 20 roads either have made no earnings, or are run by other roads, or pass their dividends from some other cause. The Hartford & Erie road makes no return of capital, debt or cost of road.

An immense anvil block, weighing some sixty tons, was recently cast at the Washington Navy Yard. This is said to be the largest iron casting ever made in the United States.

Iron in the United States.

We copy the following interesting statistics from the *U. S. R. R. & Mining Register* of Dec. 30:

As the consumption of iron is held to measure the progress of a people in manufactures, in industry, and to some extent in civilization also, the statistics of its production and importation have a high social value. The following are, with regard to this country, though not absolutely perfect, the best now attainable:

The aggregate product of pig iron in this country has increased from less than three-fourths of a million tons (of 2,000 lbs. each) in 1854, to nearly or quite two millions of tons in 1871. The returns for the several years are as follows:

Year.	Product.	Year.	Product.
1854.....	736,218 tons.	1864....	1,135,497 tons.
1855.....	784,178 "	1865....	931,582 "
1856.....	883,187 "	1866....	1,350,943 "
1857.....	798,157 "	1867....	1,461,626 "
1859.....	840,627 "	1868....	1,603,000 "
1860.....	919,770 "	1869....	1,916,641 "
1861.....	731,544 "	1870....	1,900,000 "
1862.....	787,662 "	1871....	2,000,000 "
1863.....	947,604 "		

[NOTE.—Our civil war doubtless reduced the product of 1861–2. The reduction in 1870 of the duty on imported pig from \$9 to \$7 per ton has doubtless checked the growth of iron smelting in this country.]

Of railroad bars (not steel) the domestic product has grown pretty steadily from 24,315 tons in 1849 to 620,000 tons in 1870, and probably somewhat more in 1871, though the rapid growth of the production of steel rails within the last two years may have checked the growth of the iron rail manufacture. Of the iron rails rolled in 1869, the production (in tons) was distributed as follows:

Massachusetts	32,238	New York	79,463
Pennsylvania	319,653	Maryland	27,328
Ohio	41,837	Kentucky	7,817
Michigan	6,885	Illinois	53,261
Wisconsin	8,680	Other States	16,424

Total.....593,586

Of the production of steel rails, we have no full statistics, though it is known to be large and very rapidly increasing. It was reported at 8,500 tons in 1868, 12,000 tons in 1869, and 45,000 tons in 1870. We judge that it must have reached 60,000 tons in 1871; but this is an estimate merely. No intelligent observer can doubt that steel rails are to supersede iron on all great railroads, and at the turnouts and sidings even of the smaller. Though their first cost is some fifty per cent. greater, they last so much longer than iron that a great economy is secured by the use of steel rails. Our total production of steel (rails included) is returned as follows:

Year.	Tons.	Year.	Tons.
1865.....	15,262	1868.....	30,000
1866.....	18,972	1869.....	35,200
1867.....	19,000	1870.....	75,000

We hope to learn that the product of 1871 was not less than 100,000 tons. At all events, it has rapidly increased, and is still increasing. Recent inventions and discoveries by our countrymen justify the hope that we shall, within a few years, be able to convert a ton of pig iron into a ton of steel at about the cost of the pig—that is to say, two tons of pig iron will buy a ton of steel of middling quality.

The striking improvements in the art of steel making invented by our countrymen within the last five years fully warrant this presumption.

Our importations of iron and steel are made almost exclusively from Great Britain; and these, too, have been pretty steadily enlarged, but not so rapidly as our home production. According to the British official statistics, there were exported from Great Britain to the United States, in 1850, 295,521 tons of iron of all kinds, which was swelled in 1853 to 518,000 tons. Thenceforth, it fluctuated from 385,899 tons in 1856 to 243,583 tons in 1859, and in 1862 (our civil war having put a stop to railroad making) it sunk to 53,236 tons. Thence it has pretty steadily risen, so that it reached 596,554 tons in 1869, and has gone still higher in the two subsequent years whereof we have no full statistics.

[NOTE.—These returns are given in tons of 2,000 pounds each, as in the case of our American product. They will not coincide without custom returns, being given for each calendar year; whereas our fiscal year closes with June.]

Great Britain has exported railroad iron to all countries (about half of it to the United States as follows:

Year	Tons.	Year.	Tons.
(2,000 lbs.)	(2,000 lbs.)		
1860.....	507,858	1866.....	557,783
1861.....	422,873	1867.....	650,239
1862.....	448,857	1868.....	653,507
1863.....	500,013	1869.....	1,003,350
1864.....	457,200	1870.....	1,187,337
1865.....	486,477		

Of this aggregate, 336,500 tons were exported to this country in 1869, and 472,403 tons in 1870.

The production of pig iron in Great Britain is far ahead of that of any other country, being hardly less this year than 6,000,000 tons, or about treble that of this country. Yet it was but 180,000 tons in 1800, and had barely more than doubled twenty years afterward, when it reached 368,000 tons. Ten years later, it had not doubled again, being (in 1830) 678,417 tons; but about that time railroads were devised, and the British iron product again doubled in less than ten years, being 1,500,000 tons in 1840. Five years later, it stood very nearly the same; but in 1850 it had increased to 2,250,000 tons. In 1863 it had again doubled, being 4,510,000 tons. In 1869 (our latest full return), it was 5,445,757 tons.

France made 114,000 tons of iron in 1818, 750,000 tons in 1855, and 1,380,000 tons in 1869.

Prussia made 804,052 tons in 1866, against 400,000 tons in 1860.

Belgium made 319,943 tons in 1860, and 863,000 tons in 1869.

We had hoped to include in this exhibit a view of the distribution of iron making throughout the Union, showing how steadily this industry is diffusing itself over the country; but we are disappointed. We know generally that the production of pig iron in Missouri is already considerable, and rapidly increasing; we know that it has recently been commenced under highly favorable auspices, in Indiana; we know that Tennessee, Wisconsin, old Virginia, North Carolina, and even Alabama, are successfully smelting their own ores into good pig iron, mainly by aid of charcoal; but our returns from these States are provokingly meager and inexact. May we not hope that they will not long remain so?

The production of our rolling shows a steady

annual increase during the last seven years. Here are the figures:

Years.	Rails.	Other than rails.	Total ann. product.
1864.....	335,369	536,958	872,327
1865.....	356,292	500,048	856,340
1866.....	430,778	595,311	1,026,089
1867.....	462,108	579,838	1,041,946
1868.....	506,714	598,286	1,105,000
1869.....	593,420	642,420	1,236,006
1870.....	620,000	710,000	1,330,000

Of the diverse kinds of iron produced by our rolling mills, we have nothing like full returns later than 1866, when this country produced (of other than railroad) 595,311 tons of rolled or hammered iron, returned as follows:

	Tons.		Tons.
Bar and rod...	276,192	Sheet	33,969
Nails & spikes	197,625	Hoop	16,459
Plate.....	71,507	Axle and other	49,559

This production was locally distributed as follows:

	Tons.		Tons.
All New Eng'd	87,571	Maryland.....	23,602
New York	70,197	West Virginia	24,395
New Jersey ...	48,616	Ohio	76,032
Pennsylvania	243,921	All others ...	20,955

For the facts embodied in the above exhibit, we are indebted to the American Iron and Steel Association, through H. S. McAlister, Secretary.

Plate Glass.

Plate glass, such as is used for mirrors, is properly called cast glass, for it is in reality cast in an iron mold, and afterwards polished. A quantity of melted glass is poured from the pot upon the cast iron table, and is then rolled out by an iron roller. In this way a large slab of glass is made, and its surface, after annealing, is ground down and finely polished by friction with another slab of glass. An immense amount of plate glass of this description is produced annually, amounting to many millions of square feet. It is used in the rough state, also, as a covering to railway stations, and for other similar purposes, being found well adapted to such uses.

Another kind of plate glass, with a number of longitudinal perforations in it, has come into extensive use, for the purposes of ventilation. This glass may be described as being cast in a mold, and then perforated by a plate of iron, studded with thin projecting pieces, so that the plate is perforated wherever these pieces have been placed. Mechanical means are also used to give a ribbed surface to plate glass, in order to make it more dispersive of light, this sort of glass being much employed as a substitute for ground glass.

A peculiar sort of molded glass is now considerably in use for windows. The pattern is pressed in the glass by a mold, and then, by a subsequent process, glass of another color is allowed to flow into it. The whole is then ground down to a uniform surface; and the result is, an inlaid pattern of glass of one color in glass of another. The windows thus formed are pleasing in their appearance, but want brilliancy of color. Among the triumphs of the plate glass maker, must be reckoned those vast specimens which are to be seen in some of our metropolitan stores and warehouses. Nothing can exceed the clearness, purity and brilliancy of some of these magnificent and costly sheets.

The Legal Tender Decision and the Speculative Fever in Wall Street.

The violent agitation into which the Stock Exchange has been thrown, since the Supreme Court stultified itself by a reversal of its recent decision, is sufficiently proved by the almost unexampled magnitude of the transactions of the past few days, and almost justifies the *soubriquet* with which Wall street has greeted this legal tender decision as "a measure for the indefinite suspension of specie payments." This is the first time in the history of the Supreme Court in which its decision once pronounced has failed to be regarded as the law of the land. Now there is really no law on the subject of legal tenders. The Court a year ago solemnly decided by a majority of 4 to 3 that the law of February, 1862, was not constitutional so far as to make greenbacks a legal tender for debts incurred prior to its passage. Now that decision is reversed, though the four judges then voting for it are still of the same opinion. We have so fully discussed the topic heretofore that we need say no more. We express but the sentiments generally prevailing among our people of all opinions on this subject, when we say that this scandal ought at all costs to have been prevented, and if it was impossible to avoid the one, the other should positively have been omitted. We are chiefly concerned now, however, with the effect this decision has produced on the money market where it is cited as a powerful aid to the forces previously rising into activity to promote expansion and inflated prices.

These forces are numerous. One of the chief is the return of currency, and its accumulation in our city banks. This currency has gone the usual round. It has helped as a medium of payment to settle the Christmas bills all over the country. It has been actively at work moving the products of the interior to the seaboard and elsewhere. Now these functions have ceased in part, and a large aggregate of currency so employed has returned to the country banks. These institutions, not being able to use it to advantage, decline to keep it; for it pays no interest, and its retention as idle funds would diminish the profits of their business. Accordingly many of them send it here as deposits, and thus contrive to get 4 per cent. interest upon it. By this reflux of currency which set in some days ago, and is going on with considerable rapidity, the accumulation of national currency is so perplexing to our banks that they are over eager to lend. The rate of interest is thus breaking down, and some of the banks are really so incommoded with banknotes as to be glad to lend them for four or five days without interest, on condition that the borrower shall return the loan in greenbacks.

The Treasury seems to be equally troubled with a plethora of banknotes; as may be judged from the fact that it has this week paid for its bond purchases, half in banknotes and half in legal tenders. This arrangement, which was announced beforehand, has been loudly complained of. The Treasury had no alternative, however, for its stock of national banknotes is accumulating so rapidly as to force this policy. Besides it is strictly in accordance with the law which makes national banknotes a legal tender in all payments between the government and the people.


The accumulation of currency has as usual developed a renewed demand for redemption in New York. As the law now stands, there is, in fact, no redemption of banknotes whatever. They circulate without redemption just

as do the greenbacks. Under the old system which enforced redemption these superfluous masses of banknotes which are now troubling our banks and the Treasury would all go home and be redeemed. They would thus disappear from the overcharged current of the circulation, and they would remain idle until the reviving activity of business once more called them forth from their retirement.

Under the existing plan, these notes accumulate in our city banks. Notes from all parts of the country, issued from 1,700 banks in every State in the Union, are all concentrated here, and fill to repletion the monetary current. They must be used. Our banks, many of them, pay interest for these deposits, and interest must be made for the use of them. The temptation to lend receives thus an excessive provocation. The result is over-lending. Merchants and traders receive accommodation to which their stability and position do not entitle them, and a large part of the aggregate of loanable funds find their way to the Stock Exchange with such results as to inflation and vehement speculative excitement as are now repeating themselves once more in Wall street.

But there are other causes for the prevailing ease of money and the feverish stimulus given to the stock market. Foreign capital is investing itself here with greater eagerness than ever. This week it is estimated that 8 or 10 millions of our securities have been sold on foreign account. Almost every day brings to light some new negotiations. The result is twofold. First it lightens our market of part of a burden of securities previously pressing upon it; and secondly, it adds to the accumulations of floating capital which are seeking profitable employment. The tide of easy money thus seems to be rising with resistless force, and although there are not wanting grave reasons to inspire apprehension lest there should be preparing for us a speedy reaction, these depressing warnings are unwelcome, and the possibilities of the future are unheeded in presence of the demoralizing and alluring progress of the moment.

Surely with such elements as these all tending to produce a violent and mischievous speculation not only in the Stock Exchange and Gold Room but also in all departments of industrial enterprise, it is to be regretted that the Supreme Court, the highest legal tribunal known to our Constitution, should at this critical moment descend from its high position, compromise its own dignity and consistency, and, by contradicting one of its own most solemn decisions, impart new elements of danger, incertitude and speculative insecurity to the financial and industrial system of the country.—*Fin. Chronicle*.


 The addition of an atom of water to starch converts it into sugar; the subtraction of an atom from alcohol converts it into ether. But perhaps the most curious change produced by the removal of an atom of water from a body has been recently discovered by Dr. Matthieson, of London. Morphia, the well known active principle of opium, is commonly used to allay vomiting, and very often performs the duty very effectually. But when morphia has been heated with hydrochloric acid, and an atom of water has been thereby removed, it is changed into the most active emetic known. It is not necessary to swallow it to produce the effect; a very small quantity introduced under the skin, or even, it seems, split upon the hand, is quite sufficient to produce vomiting, which, however, soon subsides, and leaves no nausea afterwards.

The Gulf Stream.

Dr. Hayes has contributed an article to the *Galaxy* for January, which goes to show that many of the speculations and assertions which have become so popular, regarding the Gulf Stream, are incorrect or exaggerated. He says that the precise limits of the Gulf Stream are yet to be determined. Wherever the particular point of its beginning may be, however, it is pretty certainly ascertained that the stream itself is produced by a current of air formed from the north-east and south-west trade winds. This current "heaps up" the waters in the Gulf of Mexico, to use Franklin's phrase, and because it comes from tropical regions, warms them. A current of water, of warmer temperature than the average temperature of the waters of the Gulf of Mexico, is thus formed. This current flows eastward and northward along the coast of North America, under the continued influence of the wind. Its rate of speed diminishes as the power of the wind diminishes, and its temperature lowers, though less rapidly, as its waters mingle with the colder waters below and on either side of it.

The point where the Gulf Stream ends, is as uncertain as the point where it begins. It is popularly supposed to divide at the northern point, one branch running north into the Arctic ocean, and the other going eastward toward the coast of Europe. There are no facts known, however, to sustain this belief. Whatever currents of water may flow in these directions can be accounted for by the force of the winds which prevail in those parts. It is thought that the Gulf Stream disappears at the northern point in the waters of the surrounding ocean, gradually losing its peculiarities in its northward course.

As to the effects produced upon the climate of North America by the Gulf Stream, Dr. Hayes denies that there is a single fact to show that it exerts any influence at all. Its current is to the waters of the Atlantic ocean as a tiny rivulet is to the broad acres through which it finds its way, and the effects produced in the two cases are about alike. At Newport, for example, whose delicious climate is popularly thought to be due to the benign influence of the Gulf Stream, its waters are one hundred and fifty miles distant, while the prevalent winds are westerly, and how temperature can "beat to windward" for that distance is a question not yet satisfactorily answered. The fact appears to be that air, when unconfined, receives no perceptible accession of heat from water. Numerous experiments have been made, confirmatory of this proposition, and a negative proof is found in the slight influence produced upon the temperature by the presence of icebergs. The mild climate of Norway and the British Isles is produced by currents of air laden with warmth and moisture, and not by the influence of the Gulf Stream.

 The Australian meats now sold in Europe, and elsewhere, have not found their way to this country, but it will not be long before the plan will be adopted here with our own meats. It has many advantages which commend themselves. If a large business be done in the putting up of canned meats, and if they are put upon the market the same as oysters and canned fruits, there will be found economy both in price and absence of waste. It will particularly be a trade which will meet the demands of new towns in remote localities, which at certain seasons are almost without a market.

Steam Ferry Between France and England.

The commission of the Assembly to whom the subject was referred has made a report approving the project of a steam ferry across the Straits of Dover, between the towns of Dover and Calais.

The commission sat at the prefecture of Arras and heard the arguments advanced by the projectors, among whom are the well known French Architect, M. Dupuy de Lowe, president of the Conseil d'Etude; M. Drouyn de Lhuys, the well known Imperialist minister; Mr. Scott Russell, the builder of the Great Eastern, and others. M. Dupuy de Lowe acts in his own name and in that of the Société des Forges et Chantiers de la Méditerranée.

The leading features in the new project are the construction of three large and powerfully engined steamers, the dimensions of which will be: Length over all, 450 feet; breadth at water line, 50 feet; depth from deck to bottom of the hold, 32 feet; deck-house, 8 feet; draught of water when loaded, 13 feet 3 inches; displacement, 4,000 tons; diameter of paddle-wheel, 50 feet; immersion of paddle-wheel, 10 feet. Each wheel will be driven by an engine of 700 horse power nominal, capable of working up to 3,500, giving an aggregate of 7,000 horses to each vessel. The two wheels will be distinct from each other, thus allowing them to be worked at different rates of speed or in opposite directions, to assist in bringing the steamer alongside the wharf or to turn the ship round in little more than her own length. On a lower deck will be a double line of rails, each line being of sufficient length to receive fifteen railway carriages and wagons, making in all a train of thirty carriages. The estimated rate of speed will be eighteen knots an hour, whereby it is hoped to perform the passage in one hour and ten minutes in fine weather, and in one hour and thirty minutes in bad. By using two steamers and having one in reserve, the projectors would be enabled to make six passages each way daily, thus carrying 2,680 passengers and 2,640 tons of goods per day, or 978,200 passengers and 963,600 tons of goods a year. The cost of these steamers is estimated at about £136,000 each, or in round numbers £400,000 for the three.

To receive these steamers, it will be necessary to construct a new dock at Calais. The projectors asked of the French Government four things:

1. The authorization to construct a *gar-maritime* or dock at their own risk—such dock to remain their sole property in perpetuity.

2. That the bridge to connect this dock with the shore and the North of France Railway shall be made at the cost of either the French Government or the North of France Railway.

3. That the French Government will use their good offices to induce the English Government to execute the necessary works at Dover for embarking and disembarking the trains brought from the steam ferries.

4. That the French Government will enter into a mail contract for twenty years with an annual subsidy of £20,000.

The projectors hoped, if all these are granted, to obtain a similar contract and subsidy from the English Government for carrying the English mails. The projectors calculated on two years and a half to put their plans into execution, and proposed that the contract of twenty years begin to run two years and a half after the state concession shall be granted.

INTERESTING POSTAL STATISTICS.—The current number of the Gotha Almanac, the most highly valued of European annuals, contains, among other things, some interesting postal statistics showing the number of letters passing through the post offices of the principal countries of the world. It would appear that the aggregate is not far from three thousand million letters yearly. The private correspondence of the different countries for last year was as follows: Great Britain, 808,000,000 letters; United States 531,000,000; France 354,000,000; North German States, 248,000,000; Austria, 99,000,000; Italy, 79,000,000; Spain, 72,000,000; Switzerland, 45,000,000; Russia, 21,000,000. To these figures must be added some 360,000,000 official letters which are counted separately, making in round numbers, the total above given. Still more interesting, however, are the results of a calculation showing the relation between the number of letters sent, and the population of the different countries. In Great Britain the number of letters mailed was 25 per head of population; in Switzerland, 18; in the United States, 15; in the North German States, 8.3; in Austria, 4.9; in Spain, 4; in France, 3.3; in Italy, 3.1; in Russia, 3. It will be matter of surprise to many that in the little kingdom of Switzerland the proportion of letters to population is so large, while in France it is so small; but the figures above given may be accepted as indicating with considerable accuracy the degree of business activity and the popular intelligence and education of the different countries named.

A NEW EXPLOSIVE AGENT.—Numerous attempts have been made to produce efficient explosives from sawdust, wood fiber, etc., in the same manner as from other forms of cellulose, as cotton and the like. One of the latest of these relates to an improved explosive compound manufactured by a novel treatment of lignine. The wood is disintegrated by a chopping machine. To extract the sap and mineral salts the wood is boiled for six hours with a solution of caustic soda or other alkaline liquid. The fiber is then washed with water, beaten and reduced to the proper shortness, and put into a strainer. After being dried, the fibers are steeped in nitric and sulphuric acids for twenty-four hours, and then washed. This is the first dip. For the second dip, the same acids are used. A second quantity of fiber is treated in every respect in the same manner. For the third dip, a third quantity is subjected to the same process. To obtain the proper strength of the explosive substance for fire arms of any description, the second and third dips are mixed together; the whole is passed a second time through the beater, and the pulpy mass is placed in a strainer. It is then molded, pressed and dried for use.

The utilization of coal dust, by adapting it to the use of fuel, has become a fixed fact, and ere long every pound of it will go on the market as a valuable product. Beside the coking of the bituminous coal dust, both the anthracite and bituminous dusts are now compounded with clay and saturated with benzene and rosin, and then molded into form for market, being termed artificial fuel. This fuel is well adapted to all purposes where great intensity of combustion is not desired—for domestic purposes particularly, and for the production of steam in stationary boilers.

— The Chicago, Burlington & Quincy Railroad paid out \$120,000 to its employees in Aurora, last month.

— Wm. S. Huntingdon, an engineer, in communicating with the *Railroad Gazette*, thus unconsciously lets off an argument in favor of narrow gauge and light locomotives: "Among other important discoveries in this age of progress is this, that we have been for nearly forty years doing a ruinous business by running about the country thousands of tons of useless and costly material, for the purpose of securing the privilege of carrying a few tons of paying freight. At least we are led to these conclusions by recent discussions on the question of dead weight, which, although they have not as yet resulted in any movement toward reducing the weight of rolling stock, will, doubtless, result beneficially in that direction as soon as some of our leading engineers recover from the temporary excitement into which they seem to have been thrown by the advocates of the narrow gauge system." Can not Mr. Huntingdon acknowledge at once that the necessity for heavy locomotives comes of broad gauge and heavy trains, and that narrow gauge, lighter locomotives and more trains will do as great a business at less cost? The practice of the subject is coming to this, and it will soon be established.

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RAILROAD RECORD OFFICE

No. 167 Walnut Street, Cincinnati, Ohio.

The Railroad Record.

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T. WRIGHTSON, - - - - }
A. J. HODDER, - - - - }

CINCINNATI, THURSDAY, FEBRUARY 15, 1872.

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Ground for Railroads—The Statistics of the South.

I received to-day the RECORD of the 1st inst., containing a most excellent article from the *Commoner*, on the mistake railroad companies have made in not securing ground enough in the beginning. If the railroad companies wanted to make a great speculation in real estate, they could not have made a more certain one, than in buying four times as much real estate as they did. Take the Cincinnati, Hamilton & Dayton Railroad as an example. Mr. L'Honmedieu in one of his last reports says, that when they first purchased their ground at the foot of Sixth street, they supposed they had much more than they needed. So far from that, they had to purchase double as much, and they have to-day not half enough. Just look at the railroads in the west end. There are six railroads coming in there, crossing each other in every way, and the whole of them having no more ground than should belong to one. The *Commoner* is entirely right in saying that ground can be got at the east end, and should be got immediately. The Tunnel will be made, and it will work a great revolution in the east end of the town. Let the railroad companies interested in the matter attend to it early. There are two railroads especially, which must enter the town in that direction, and they will not be wise if they do not immediately proceed to secure grounds. These are the Kentucky & Great Eastern and the Chesapeake & Ohio. Both these roads will be made,

and that in a short time. Let them secure all the vacant ground they can get.

I did not begin this letter with a view to that subject, and I will proceed to give some statistics which I thought would be valuable, in case the "Southern road" was made. The States to which the "Southern road" would both contribute to, and receive from, valuable services, aiding both Cincinnati and themselves in the great work of human progress, are Tennessee, Alabama, Georgia, South Carolina, North Carolina and Florida. To all of these the Southern road would make a direct commercial connection—profitable to both parties. I estimate that the difference between the *average* cost of manufactured articles, grain, etc., in these States and in Cincinnati, is full 40 per cent. If a direct, ready, rapid transportation existed between Cincinnati and the South, this 40 per cent. would be about equally divided. The South would get all that Cincinnati could sell, 20 per cent. cheaper, while Cincinnati would get 20 per cent. more profit. These two results would *increase* the trade of Cincinnati four-fold, and in this particular region of country ten-fold, for, as I have stated before, Cincinnati is in this region ignored. You observe I say nothing of the cost of transportation in this estimate, because the cost on the new route, with double speed, and double advantages, will not even be as much as it is now on the old routes. Of course not, for the route will gain 200 miles, and by the energy and superiority of its management will gain in the economy of its transportation. I am rather disgusted with these Southern railroads. They bear just about as much proportion to Northern railroads, as a wheelbarrow does to a stage coach. There is no use talking, this whole country is *slow*. But, if Cincinnati succeeds in the Southern road, it will work a great revolution. It *must* work a revolution, or we shall fail in a large part of what is expected from this enterprise. Well, I will now give you the statistics of these six Southern States, as in 1860 and in 1870, taken from the U. S. census, first of population:

	1860.	1870.
Tennessee	1,009,851	1,258,520
Alabama.....	964,201	996,992
Georgia	1,057,280	1,184,109
North Carolina	992,622	1,071,361
South Carolina	703,708	705,606
Florida	140,420	187,748
Total.....	4,878,092	5,404,336

In ten years, the South proper, increased but 12 per cent, but four years of that period were years of terrible war. Many of our statisticians and economists did not expect it to grow at all. The losses of the war were terrible, and far more in the South than in the North. It was said that the negroes would decrease instead of increase. It was said the mothers would not take care of their children; that the negro could not live without

the help of the whites, and fifty other things equally groundless and ridiculous. But to expect human nature to change its instincts and intelligence to suit the theories of politicians, was the substance of folly. The South has increased but slowly in consequence of the war, but the negroes have increased as much in proportion as the whites. Nature goes on true to her own laws, and politicians go on true to theirs—to exalt or to depreciate every element of the public condition to suit their own interest and ambition.

The increase of the South, by 12 per cent. in the last ten years, is more than we might have expected of them. What I have said before, that there is a great recuperative power still in the South.

The surface of the six States named above, is as follows, viz:

Tennessee.....	45,600 Square Miles.
Alabama	50,000 "
Georgia	58,000 "
North Carolina	45,000 "
South Carolina	24,500 "
Florida.....	59,268 "

Surface..... 281,268 Square Miles.

The following are the value of the agricultural products of three of these States, to which the "Southern road" will immediately go:

Alabama.....	\$140,000,000
Georgia.....	125,000,000
South Carolina.....	75,000,000

This makes \$340,000,000. As I have stated, I think, in a former article, \$100,000,000 of this sum may be relied on to buy the products of manufacturers, and grain, and iron in Cincinnati and Ohio; *provided*, always, and it is only on these conditions, that not only a direct Southern road, but that there are direct and sufficient connections in the Southern States to make transmission of products from Chattanooga, through Georgia. Alabama and South Carolina, for they need as much improvement there, as in getting to Chattanooga.

I have just seen a paragraph stating that one line from Chattanooga stopped entirely, leaving the passengers on the road. I think there is no danger of that in Georgia; but the roads there are too slow for an active, heavy business. E. D. M.

AIKEN, S. C., Feb. 8, 1872.

The original estimates for the St. Louis and Illinois bridge, including land damages, was \$1,686,475.44; the total expenditures to Sept. 1, 1871, amounted to \$3,616,560.90; the additional amount required to complete the bridge is \$1,919,497.17; making the entire cost of bridge and approaches \$5,566,058.19—an excess of \$1,479,582.72. It has since been found, however, these estimates are about \$1,179,000 too low; the excess of the actual cost of the work over the estimates being satisfactorily accounted for by the engineer in charge.

The Narrow Gauge.

So far, the narrow, or what is better recognized as the three foot gauge has proved a success, and those who so vigorously opposed its introduction into this country, are now letting down and accepting the inevitable with becoming alacrity. We may now regard the narrow gauge as a fixed fact in this country. It has proven capable of doing the business of a large part of the country now supplied with roads of greater capacity, and will therefore be adopted in similar sections of our country where roads are yet to be built. How profitable they will be, remains we think to be determined, notwithstanding the various estimates upon their returns upon cost that have been given to the public. For ourselves we have no doubt of their profit upon their legitimate cost. Our fears are, that we shall run into a narrow gauge mania, and that these valuable improvements will have to pass through a speculative period, that by ways and means well known to our financiers, they will load them down and for years embarrass them, as were some of our best, and now most productive roads of the standard gauge in the first decade of their existence.

We hope this will not be the case. We would like to see these new enterprises built with a liberal share of ready money, and not upon a strained credit. If this can be done, and we see no reason why it can not, the next five years will add to the railroad mileage of the country, more than double the amount of any equal period in the past, and will increase the wealth of the country enormously, and what is quite as desirable, there need not be, and probably will not be, a single such road that will not pay, reasonably, upon the investment necessary to call it into existence.

It is in the power of capitalists more than any one else to insure this result. They have it in their own hands, and ought to exercise it for their own good as well as that of the country and the railroad interests. Let them resolve, that they will supply no money to a line of road that is not necessary for the country through which it is to pass, and that will not be sustained by a large and profitable local business, either immediately or prospectively. Next, under no circumstances sustain a competing line, unless there is business enough to support such new interest, and then above all other things positively refuse to aid any such road, the financial policy of which will make it cost much more than it could be economically built for with ready money. There is no reason whatever why these new projects should be made the victims of wild speculations, and their securities sacrificed in the money markets, and their cost enhanced beyond the legitimate outlay requisite to construct them, and the added sum incident to such operations for misfortunes, delays, etc., usually classed under the head of contingencies.

Let their cost be represented by a fair amount of stock and reasonable amount of credit, sufficient to build them well, with all the improvements that further experience in their construction and operation will develop, and they will prove themselves quite as capable of paying certainly and handsomely upon their cost, as they are now known to be for the traffic they essay to perform. All interests will therefore be benefited, and a new era of railroad prosperity be inaugurated in the country.

Timely Words.

The Louisville *Courier-Journal* of the 7th inst., has an able article upon the question of the discretionary power of County Courts to submit the propositions of certain railway companies to the people of their counties.

This question is now being agitated in various sections of the State of Kentucky with such acrimony, and such varied results, that it has found its way for a settlement into the Legislature, and is there undergoing the ransacking for which that body is famous.

That it is a question which ought to be settled, and settled now, there is no doubt. Great interests are hanging upon it, the prosperity of many new corporations in the State are depending upon it, the improvement of many of the most valuable sections of the State will be retarded whilst the conflict upon this question continues, and capital and enterprise and skill will find opportunities elsewhere if it is kept open too long.

Without wishing to enter into a discussion as to how this matter should be disposed of, for ourselves we can not see how those who espouse the discretionary power of the County Courts can sustain themselves. Their arguments go directly against the rights of the people to be enlightened upon a matter that so nearly concerns them as railroads. They impeach the capacity of the people to judge for themselves, they deny them the right to act in the premises, they forbid the matter passing beyond the sacred limits of the County Court; for some strange and accountable reasons never yet announced, they impute a wisdom and sagacity to the County Court beyond what they are willing to concede to *all* the balance of the people, though the gentlemen constituting this Court may be recently taken from the masses. Such a doctrine will not stand the test. It needs but discussion, and representation to the people who are more injured by it than any one else, to break down, and we believe to sooner or later break, politically, the men who advocate it.

But hear the *Courier-Journal* upon this point.

"To commit such a question for final decision to such a tribunal seems to us unwarranted by any considerations germane to the case. We believe it an infraction of that clause of

the constitution that vests all 'legislative power in the General Assembly,' finding, as we do, no authority by which it can be delegated to the County Court or any other tribunal. The Legislature should say that the people shall or they shall not vote upon these questions; and not avoid responsibility by vesting the County Courts with the discretionary power as allowing them to vote or not, as may suit their whims or interest.

"The County Court is the lowest tribunal known to the law—composed as it is of Justices of the Peace, whose jurisdiction is limited to controversies involving the petty sum of fifty dollars; and even then an appeal is allowed. With what propriety can you, by special act, commit for final decision a question involving hundreds of thousands of dollars, and affecting every human being in the county, to a body of men who are not allowed by general law to determine a suit involving the value of a yearling calf?

We say final decision; and do as advisedly, as five-sixths of the people of a county may be in favor of a railroad subscription and yet be able to elect only a minority of the County Court. Railroads seldom traverse more than three precincts of a county; that in which the county seat is located and one on either side. Owing to the usual preponderance of population about the county seat these three precincts will usually contain two-thirds of the voters of the county, but can elect only six magistrates, while there will be four or six little precincts lying off the line of the road and opposed to it, that will elect from eight to twelve magistrates though altogether they contain not more than one-third the voters of the county.

"There is much anxiety, we learn, among some of our rising young statesmen at Frankfort to protect the people against railroad corporations and they present the County Courts as a barrier against these aggressions. The trouble is the people are outside the citadel and the railroad corporations safely ensconced within. The case of Bourbon county illustrates the general condition of affairs throughout the State. The people of that county, with a single line of railroad that bleeds them mercilessly, are only better off than those who have none. After submitting for a long time to exactions grievous to be borne, they are determined to build a competing line. The Maysville Railroad Company have control of the County Court, however, and at their bidding that court places its foot upon the rival enterprise. The railroad corporations against which the people of Kentucky need protection are those now operating roads that have a monopoly of transportation. They need no protection against companies organized to build new roads; for these constitute their only means of deliverance. We trust the Legislature will espouse the cause of the people in their struggle to free themselves from an oppressive monopoly, and, while placing upon any railroad corporation all proper restrictions, they leave the people free. All efforts to protect them against themselves are but the makeshifts of empty demagogues, and had better be deferred until we undertake to change our form of government. We believe in liberty regulated by law; but the law that deprives the people of the right to vote upon questions most vital to their interests strikes at the very roots of true Democracy.

"The bill now pending should be styled 'An act to repeal the veto power of the County Courts in certain counties, and to restore to the people thereof the exercise of the right of suffrage.'"

Journal of Railroad Law.

Railroad Companies—when County has Power to make appropriations for construction of—Rights of Tax-payers.

The facts in the late case of *Harney vs. The Indianapolis, Crawfordsville and Danville Railroad Company* and others, (32 Ind., 214,) are fully and clearly stated in the following opinion by—

FRAZER, C. J.—The complaint shows that the appellant is a taxpayer of Montgomery County; that the Indianapolis, Crawfordsville and Danville Railroad Company is a private corporation, organized to construct a line of railroad through the County of Montgomery; that the county, having in its treasury, in cash and demands due, the sum of one hundred and seven thousand dollars, of which sum sixty-five thousand eight hundred and ninety-five dollars and forty-nine cents was in notes and mortgages for money loaned, on the 29th of June, 1867, by the board of commissioners, entered of record an order, as follows:

"It is ordered that the sum of one hundred and twenty-five thousand dollars be, and the same is now, donated to the I. C. and D. R. & Co., to be used in grubbing, grading, bridging, and putting on ties for the track of the road from Crawfordsville to Indianapolis; that said money is not to be used for any other purpose than as above; that said donation shall be placed by said company in Elston Bank, under the control of Major I. C. Elston, Sen.; and that a sum not exceeding fifty thousand dollars shall be drawn out by said company until the entire line * * * is made ready for iron. And it is further ordered that the county auditor draw warrants on the county treasurer for fifty-seven thousand dollars, and deliver, with the bonds and mortgages in his hands belonging to the county, amounting to sixty-five thousand eight hundred and ninety-five dollars and fifty-nine cents, to Major I. C. Elston, for the purpose above named." It was further averred that said notes and mortgages, amounting with accrued interest to sixty-eight thousand dollars had been, together with a warrant on the county treasury for \$57,000, placed in the hands of Elston, in execution of the order of the board; that the treasurer was paying money to said Elston upon the warrant, as fast as it came into the treasury; and that said Elston would dispose of the means so placed in his control as provided in the order donating the same. The relief specially sought was an injunction restraining the execution of the order of the commissioners.

The error assigned is, that the court below sustained a demurrer to the complaint.

The question before us does not involve a consideration of the wisdom or policy of the proposed municipal aid to secure the construction of an important thoroughfare, deemed, we doubt not, of great local advantage to a large part of the citizens of Montgomery County. That inquiry was not presented by the demurrer.

The position maintained by the appellant is, that the board of commissioners had no lawful power to make such an appropriation out of the county treasury, and hence that in doing so they exceeded the authority conferred upon them by law.

The counties are corporations created for the purpose of convenient local municipal government, and possess only such powers as are conferred upon them by law. They act by a board of commissioners, whose authority is defined by statute. One of the powers con-

ferred is, to collect taxes levied upon the people and property within the county. In the disposition of the money thus collected into its general treasury, the board has not unlimited discretionary choice as to the objects upon which it shall be expended. It can only be applied to certain specified objects, and the building of railroads is not one of these objects, or necessary to carry into effect any of the purposes for which such corporations were created.

The statute defining the powers, both corporate and judicial, of boards of county commissioners, enumerated the powers given with care; so that there is little room for doubt as to the extent of those powers. If the authority attempted to be exercised in this instance had been conferred, the statute giving it would not have escaped the attention of the learned counsel representing the appellees, whose carefully prepared printed argument so well attests the skill and industry to which the important interests of his clients have been committed. But no such statute is brought to our attention. The initial point of the argument is taken from Kent, viz: that "public corporations are such as are created by the government for political purposes, as counties," &c., "they are invested with subordinate legislative powers, to be exercised for local purposes connected with the public good," &c., 2 Com., 275. A further step in the process of reasoning is, that appropriations for the public good may be made, as incident to the object of the creation of such corporation, unless such appropriations are prohibited by statute or the constitution; and, finally, that this, being for the public good and not prohibited, was therefore authorized. But this argument assumes, at the start, what is not true, as we think. While it is undoubtedly true, that municipal corporations, in common with all other instrumentalities of government, are established for the public good, it is not true that they are ordinarily left at liberty to exercise an unlimited discretion in accomplishing that object, or that they are possessed of that discretion, unless there is an express limitation imposed. The power to collect money by the imposition of taxes is a high sovereign power, and it is not to be assumed that the legislature has delegated that power to municipalities for discretionary purposes where it has named the purposes for which the money must or may be expended. Such enumeration of objects of expenditure would, according to all authority, exclude objects not enumerated or implied. It need not be controverted that the legislature could clothe counties with power to make such donations as was here attempted. That is not the question before us. Has it been done? Unless the statute book shows affirmatively that it has been done, expressly or by fair implication, the conclusion is irresistible that the action of the board of Montgomery County was without authority of law, and therefore void. There is no such statute.

But it is contended that a taxpayer has no such interest in the funds belonging to the County-treasury as will enable him to maintain a suit to prevent unlawful appropriations thereof. We cannot regard this question as open to further discussion in this court. It has been a common remedy in this State, and has been sanctioned by repeated judgements here. It has been sanctioned elsewhere. It is sanctioned by established principles, acted upon and recognized everywhere. The citizen may not be able to protect himself in any other way. If this is not his remedy, he has none. The money drawn from him by taxa-

THE AMERICAN WORKING PEOPLE, a monthly magazine earnestly devoted to the cause of protection to American industries, and to the interests of the working people, comes to us this month full of terse exhaustive articles against the policy of a revenue tariff only. It is liberal in tone, comprehensive in grasp, and thorough in its dealings with the great questions to government and society which it undertakes to discuss. Upon its first page appears a scene of farmer's life and surroundings under free trade and protection. In the former poverty indicates the result of seeking a market across the ocean, and in the latter plenty and comfort revealed on all sides are a powerful argument in favor of protection. It is a truthful picture.

On the second page appears the "History of Protection" by the editor, in which the commercial policy of European governments to the American colonies will be rigidly investigated with a view to elucidate and evolve the truth underlying the antagonistic theories of protection and free trade. The history will be carried down to the present time and it is understood will then appear in book form. The story of "Katie Kyle" breaks a monotony and it becomes immediately interesting.

The disastrous consequences of English free trade in Ireland is portrayed from historical sources.

The biography of the eminent railway engineer, George Stephenson, is introduced and furnishes an instructive and encouraging chapter to workingmen.

Its protection articles strikes home, and should be read by all who feel an interest in the social and political conservation of American workingmen and American ideas. Numerous well chosen selections intersperse the voluminous original matter, and on the whole we have not lately met with a more valuable and interesting magazine.

It should be read by all classes. Published by the Iron World Publishing Company, Iron World Building, Pittsburg, Pa.

—At the close of the last fiscal year, June 30, 1871, the subscribed stock to the Southern Pacific was \$3,221,000, and the amount paid in \$1,991,600. Since the date of the last annual report of the company, 280 miles have been surveyed and explored. Of this nearly all the work has been on that portion from Gilroy through the different passes over the Mount Diablo Range to the San Joaquin Valley. The cost of the surveys has been \$30,090.52. The amount received for passengers is \$256,410.13, and that for freight is \$144,444.48. The expenses on account of the road and fixtures are \$222,427.06. The principal of the company's indebtedness on account of their bonds issued is \$480,000, and on account of the assumption of the bonded indebtedness of the San Fra. & San Jose R. R. Co., \$740,000, possession having been taken of the latter company's road, etc., on the 13th of Oct., 1870. 50.26 miles of the Southern Pacific Railroad and telegraph lines have been completed and accepted.

tion may be squandered by unlawful donations to forward all manner of visionary schemes. Other contributions may be wrung from him from year to year, and wasted in the same way, in defiance of laws carefully framed for his protection, and he would nevertheless be helpless. A more proper case for injunction cannot be well conceived than that in which a taxpayer seeks to protect from lawless waste a public fund, which, when dissipated thus, the law will with strong hand compel him to replenish. See *Gifford vs. N. J. R. R. Co.*, 2 Stock. 171.

Nor was it necessary to appeal from the action of the board of commissioners. If we are correct in the opinion that there was no authority of law by virtue of which the commissioners could act as they did, then their action was void, and all who attempted to carry it into execution were proceeding without authority, exactly as if no such order had entered by the commissioners.

It is urged, however, that the order of the commissioners has been fully executed and performed; and that consequently an injunction would be wholly ineffectual to prevent the mischief sought to be arrested. We do not so understand the averments of the complaint. It is true, that the donation is in terms made to the railroad company and it is provided that it shall place the fund donated in the Bank under Elston's control; but it must not escape notice that the notes and mortgages, and the warrant on the treasury were directed to be, and accordingly have been delivered by the auditor to Elston, for the purpose mentioned in the order, that is, to be by him paid to the railroad company when the condition shall be performed upon the happening of which such payment is to be made, and that the whole remains under Elston's control. These facts appearing by the allegations of the complaint, must on demurrer be regarded as true. The state of the case, then is, in brief, that the whole is yet the property of the county, existing in specie, but unlawfully in Elston's custody and control; and we see no difficulty in making an injunction effective to stop it where it is, and prevent the full consummation of the unlawful proceeding.

Reversed with costs; and cause remanded, with directions to overrule the demurrer.

—Iowa is second to no State in the Union in point of internal improvements and development of resources at the present time. On the 31st of December, 1863, there were 1,488 miles of railroad in the State, and on the 31st of December, 1870, there were 2,783 miles, an increase of 1,395 miles in two years. There are now 3,000 miles of railroad in operation in the State. According to the estimates of the State Treasurer, the value of the property now in railroads may be put at rather more than \$80,000,000, or about one-eleventh of the entire value of all the property in the State.

There are now in operation in the United States and Territories 1,784 national banks, representing capital paid in to the amount of \$162,518,601 60; bonds on deposit, \$365,444,350; notes issued, \$380,609,879; notes in actual circulation, \$322,932,030 20. In addition, the two gold banks in Massachusetts and California represent paid in capital amounting to \$1,300,000; bonds on deposit, \$630,000; circulation, \$495,000. The total amount of all kinds of United States bonds held to secure the redemption of the note of national banks is \$366,094,350.

Atlantic & Great Western R. R.

The main line of the road is 337.32 miles long—49 14 miles in New York; 92 16 in Pennsylvania, and 246.02 in Ohio. The total length of the road owned by the Company is increased to 425 50 miles, by the Meadville & Oil City, 33.20 miles, and the Wadsworth (O.) & Silver Creek 4.93 miles. The Company operate, under lease, the Cincinnati, Hamilton & Dayton Road, 60 13, and the Cleveland & Mahoning, 80 18 miles. The total operated (including sidings, 141 45 miles) amounts to 707.26 miles. The rolling stock amounts to 166 engines, and 81 passenger, 35 baggage, etc., and 3,430 freight cars. The management of the Company, since its organization, have provided for additions of 40 locomotives, 30 passenger coaches, and freight cars as follows: iron tank, 200; coal, 1,000; box, 1,000, and stock, 600, at a cost of \$2,720,000. The permanent road will be improved at the cost of \$2,835,000, amounting to a substantial reconstruction of the road.

The earnings for 1870-71 amounted to \$4,213,936.81; the transportation expenses to \$3,455,038.02; and the net earnings over operating, to \$703,075 64. Adding items of expense (including lease of M & Gt W., \$1,236,127.62), the expenses amounted to \$694,780, 71 in excess of earnings.

The capital of the reorganized Company amounts to \$77,500,603—including \$11,040,006 first mort. 7 per cent. bonds; \$5,000,000 7 per cent. reorganization stock; \$8,445,590 2d general mort. 7 per cent. bonds; \$28,215,101 3d general mort. 7 per cent. bonds; \$9,875,906 preferred 5 per cent stock, and \$19,950,000 common stock.

The new bonds are dated January, 1, 1872. The first coupon on the First M Bonds will be due July 1, 1872; on the Second M Bonds (from March 1), Sept. 1, 1872; on the Third M Bonds (from May 1), Nov. 1, 1872. The total amount required for interest, will be \$5,332,524, as follows; payment absolute \$1,916,172—770,981 on 1st mort.; \$280,000 on reorganization stock; \$591,191 on 2d mort., and \$274,000 on 1st & M R. rental; payment contingent on earnings, \$3,466,352—\$1,975,057 on 3d mort.; \$493,795 on preferred stock, and \$997,500 on common (5 per cent) stock. Resumption of payment is to begin, as is seen from the above, this year on the first of March, April, July, September, and November. The Company organization is as follows:

Directors—Geo. B. McClellan, President; Lloyd Aspiwall, S. M. L. Barlow, Wm. B. Duncan, and A. S. Hewitt, N. Y. city; Reuben Hutchcock, (late Receiver), Cleveland, O. H. F. Sweetser, General manager, Meadville, Pa.; John Tod, Cleveland, O.; Laurence Wells, N. Y. city; Geo. B. Wright, Vice-President, Cleveland, O.; and James McHenry and Henry B. Sharp, London, England.

Treasurer—James B. Hodgeskin, N. Y. city.
Secretary—Charles Day, N. Y. city.

Agents in London—Bischoffsheim & Goldschmidt, Founders' Court, Lothbury, London.

—A writer to the Medical Times and Gazette refers to the fatigue of the limbs produced after a long railway journey as due mainly to the trembling motion of the floor under the feet, and states that, having suffered considerably from this abuse, he was induced to try the experiment of using the well-known air-cushion as a footstool. This answered so well that he has never traveled without using one in this way, and has found the effect to be a remarkable improvement.

Railroad Officers as Stockholders and Speculators.

A bill is now pending in the lower house of the State Legislature which provides, in effect, that no director, trustee or officer of any corporation formed under the laws of the State of New York, or having an office in that State, shall purchase or obtain any interest in, either directly or through an agent, any stock in the corporation of which he is an officer, under penalty of fine and imprisonment; also forbidding any person to act as broker or agent of such officer to make such purchase, under the same penalties. It is understood that the object of this measure is to prevent the officers of railroad and other companies from speculating in the stocks of the companies with which they are connected. If the bill had proposed that the officers of corporations be prevented from selling or otherwise disposing of, instead of from buying or otherwise obtaining stocks of the companies with which they are intrusted, it would seem less like a pleasantry. As it is, we suspect the originator of the measure of an attempt to perpetrate a joke upon his fellow members. There is certainly a pretty general belief that the corporate officer most likely to discharge his duties faithfully and well, is not the one who has the least interest in the permanent prosperity of the enterprise of which he is a manager, but the one whose whole wealth is invested in it, or whose income is largely dependent upon it. At the same time there is an evil existing which this legislation is in appearance aimed at, although it clearly fails to meet it. Directors and officers of our large corporations have peculiar means for obtaining information with regard to the company with which they are connected. Many of them use this information in a way to unduly depress or inflate the stock, and at the same time sell or buy greatly to the detriment of permanent investors. This speculating upon information which all the stockholders are equally entitled to is a very great evil. But there is a perfect remedy if our Legislature wishes to apply it. Let our zealous friend who has introduced the bill in question introduce another requiring all railroad corporations to make and publish a monthly report of their earnings and expenses under oath, and to give the same public notice of every increase of stock or bonds, and of every lease they propose to make;—in a word, requiring them to expose to the public view all the inside machinery which is now kept concealed simply for the benefit of the knowing few;—let him do this and then press the measure to a vote, and we shall soon learn what disposition there is to reform this great and growing evil.


It is reported that the Treasury Department at Washington is designing to place \$600,000,000 more of the 5 and $\frac{1}{2}$ per cents, one-half of each, between this and next January. This announcement is made, no doubt, to see how the public will accept the prospect, now that suspicion is hardening into belief that by the recent negotiation of \$200,000,000 5 per cents. brokers and their associates were enabled to divide over \$3,000,000 in commissions and allowances.

—The importation of old rails, as scrap iron, for the year 1871, reached 150,000 tons. Not near so much is expected during the present year, as it is now being re-rolled at home very largely.

*Organization of Companies is a condition
Precedent to the Liability of Obligor to
pay his Stock Subscription.*

Experience shows, that the opinions of persons of skill are often more reliable than the judgments of those who speak from knowl-

In Indiana, the Cincinnati, Wabash & Michi-

 The total revenues of the Chesapeake and Ohio canal for 1871 was \$494,281.16; the total expenses \$200,112 08—leaving the net earnings \$294,169.08.

What is to Become of the Erie Railway?

The demise of the leading manager of the Erie Railway, the master spirit of that combination which stole a railway from its owners, and by the aid of effrontery, money and a corrupt judiciary, held it to its own benefit against the most energetic efforts of the managers of a rival road, and a real majority of Erie shareholders, is an event of some consequence to the public. There can be no doubt that by keeping the Erie out of the control of Vanderbilt, Fisk and Gould did the public good service. The success of any combination by which the Central and the Erie roads should be placed under the control of so unscrupulous a financier as Mr. Vanderbilt has proved himself at the expense of the public, can not but be held as a public misfortune. So far the quarrels of Vanderbilt with Fisk and Gould have been of advantage to the public, as thereby a monopoly of transportation between the commercial metropolis and the West has been prevented.

But what is to follow? A bill has been introduced into the New York Legislature repealing the famous five years' term of directorship of the Erie road, with fair prospects of success; and under some influence the price of Erie shares has advanced, showing that some party or combination thinks it of importance to secure enough of the shares to control the election of the new board of directors. The question which the public is now most interested in is, will the control of the Erie pass into the hands of the Vanderbilt clique, and be operated by that shrewd financier who now makes the public pay ten per cent. annually upon some \$34,000,000 of fictitious capital on the New York Central Railway? How far the real shareholders of the Erie may be influenced by the golden promises of Mr. Vanderbilt is yet to be ascertained; but the chances are that a majority of the shareholders will think favorably enough of his combination scheme to give the road into his hands, unless some action is taken by the New York Legislature to prevent it. Mr. Vanderbilt, if he succeeds in his long contemplated project of securing control of the Erie Railway, will be led to effect such changes in the tariffs of the two roads as will make his investment in the Erie a paying one; and as he is not noted for moderation in profits, will be likely to increase the charges for transportation to the end of paying a dividend on the presumed cost of the road, something over one hundred millions of dollars, about three-fifths of which is bogus, or entirely fictitious. The business men of the country have therefore a most decided interest in the question of what is to become of the Erie Railway. And they have a like interest in knowing what is to become of other important roads gobbled up or being gobbled up by the Vanderbilts and men of that ilk, who are swiftly consolidating, under one imperious hand, the transportation lines of the Middle, Western and Southern States. Without some check, either by State or national legislature, the entire public will be made to pay double what they fairly ought for passenger and freight transportation. There seems no end or stop to the issue of fictitious railway capital, and but slight indications on the part of the different State Legislatures of a purpose to prevent this iniquity. The great national highways have thus fallen into the hands of a small band of freebooters, who lay a tax upon all travelers and all business interests, as unjust and uncalled for as would be a toll collected upon the commerce of New York or Boston

by a piratical armed vessel holding the entrance to the harbor of either of these cities. Now what is wanted is legislation to reduce the capital of every railway in the country to its actual cost, and to limit the annual dividends to a fair percentage. How shall this just and fair demand be secured?

Ohio River Bridges.

The following description of the bridges over the Ohio river—the one connecting the Parkersburg Branch with the Marietta & Cincinnati Railroad, and the other the Main Stem with the Central Ohio Railroad, at Bellaire—is from the Report of the Master of Road.

The expenditure for labor and material for these bridges on the Ohio river, at Benwood and Parkersburg, amounted at the close of the year to \$2,337,156 80.

BENWOOD BRIDGE.

The bridge constructed by the Baltimore & Ohio Railroad Company over the Ohio river, at Benwood, West Virginia, was first opened for the passage of trains on the 21st day of June, 1871. The first stone of Ohio shore Pier No. 1, was laid May 2d, 1858, and from that date to the final opening the work was prosecuted without intermission.

Approaches.—The West Virginia approach is by a line diverging from the Main Stem of the Baltimore & Ohio Railroad, near Benwood Station, and extending with cuts and fills 2,400 feet to the West Virginia abutment. The Ohio approach is by a line diverging from the Central Ohio Division of the Baltimore & Ohio Railroad at the company's stock grounds, and extending by cuts and fills 2,250 feet to the first Ohio abutment. The approach is then continued across the company's grounds and through the city of Bellaire, along First street, by a solid and ornamental arcade work of first class masonry, extending by 43 arched spans of 33 feet 4 inches each, from center to center of piers, a distance of 1,433 feet 4 inches, and of an average height of 45 feet, to the second Ohio abutment in the city of Bellaire.

Masonry.—The masonry consists of solid ashler, and the workmanship is first-class in every respect. The material employed is sand stone, obtained from the Ohio quarries.

The grafton stone is used for the pier-facing where exposed to the action of the ice. The masonry of the Benwood bridge piers ranges from 40 to 110 feet in height, and of an average height of 77 feet, are 14 in number, and with the Ohio and West Virginia abutments contains 25,374 cubic yards of masonry; the arcade work contains 14,854 cubic yards of masonry; total quantity of masonry, 40,228 cubic yards.

Superstructure.—The spans beginning at the West Virginia abutment are of the following lengths from center to center of masonry: Span No. 1, is 121 feet; Nos. 2 and 3, each 106 feet 6 inches; Nos. 4, 5, 6 and 7, 107 feet 6 inches. These spans, from 1 to 7 inclusive, are deck "Bollman" spans, and were built at the company's shops, Mount Clare. Span No. 8 is 211 feet; No. 9, 212 feet; No. 10, 213 feet; No. 11, 348 feet; No. 12, 241 feet 6 inches; No. 13, 210 feet in length. These spans, from 8 to 13 inclusive, constitute the river or waterway spans, and are of a total length of 1,435 feet 6 inches. Spans Nos. 11 and 12 are the channel spans. These are of the "Linville and Piper" truss, and were built by the Keystone Bridge Company, of Pittsburgh, Pa. Span No. 14, is 107 feet; No. 15, is 105 feet in length. These spans are deck

"Bollman," and were built at the company's shops at Mount Clare.

The total length of open work is 2,411 feet 6 inches. The total length of bridge, from end to end of masonry, is 3,916 feet 10 inches. The total length of bridge and approaches is 8,566 feet 10 inches.

PARKERSBURG BRIDGE.

This bridge constructed by the Baltimore & Ohio Railroad Company over the Ohio river at Parkersburg, West Virginia, was first opened for the passage of trains on the 7th day of January, 1871.

The first stone of River Pier No. 1 was laid on the 29th day of July, 1869, and from that date to the formal opening the work was prosecuted without intermission.

Approaches.—The West Virginia approach is by a line conforming to the street grade through the city of Parkersburg to the West Virginia abutment in Washington street.

The Ohio approach is by a solid and durable embankment beginning at the main bluff and extending across the river valley to the length of 2,676 2-12 feet, and to a height of 40 feet at the Ohio abutment, on the West side of Main street, in the village of Belpre.

Masonry.—The masonry consists of solid ashler, and the style of workmanship is first-class in every particular. The material employed for the upper masonry is sand-stone obtained from the Ohio and West Virginia quarries. The foundations of the River Piers and the parts of the piers subject to the pressure and abrasion of the ice are constructed of stone from the Grafton quarries.

The masonry of the Parkersburg Bridge Piers ranges from 10 to 108 feet in height, and an average height of 54 feet, and are 45 in number, and with the Ohio and West Virginia abutments contain 38,406 cubic yards of masonry, and approach 646 cubic yards. Total amount in bridge and approach 39,052 cubic yards.

Superstructure.—The spans beginning at the West Virginia abutment are of the following lengths from center to center of masonry: Nos. 1, 2, 3, 4, 5, 6 and 7 are each 25 feet. Nos. 8, 9, 10 and 11 are each 29 feet 6 inches, and these eleven spans are shad-belly spans, constructed at the company's shops Mount Clare. No. 12, crossing Market street is 65 feet, and is a boiler plate girder span, built by the Keystone Bridge Company. Nos. 13, 14, 15, 16, 17 and 18 are each 59 feet. No. 19, crossing Julian street, is 65 feet. Nos. 20, 21, 22, 23, 24 and 25 are each 59 feet. No. 26, crossing Ann street, is 65 feet. Nos. 27, 28, 29, 30, 31, 32, 33 and 34 are each 100 feet. These from No. 14 to 34 inclusive, are deck "Bollman" spans, built at company's shops, at Mount Clare. No. 35, 209 feet; No. 36, 211 feet; No. 37, 213 feet; No. 38, 349 feet; No. 39, 349 feet, and No. 40, 213 feet in length, constitute the river or waterway spans, and are of a total length of 1,544 feet. Nos. 38 and 39 are the main channel spans, and are "through" spans. Nos. 35, 36, 37 and 40 are deck spans. These spans, from Nos. 35 to 40 inclusive, are of the "Linville and Piper" truss, and were built by the Keystone Bridge Company. Spans Nos. 41, 42, 43, 44 and 45 are each 121 feet span. No. 46, crossing Main street, and the span crossing Walnut street, Belpre, are each 126 feet 5 inches in length. These are deck spans built upon the "Bollman" patent at company's shops, Mount Clare.

The total length of open work is 4,397 feet 10 inches. The total length of bridge is 4,463 feet 10 inches.

The total length of bridge and approaches is 7,140 feet, equal to one mile and 1,860 feet.

British Railroad Progress.

In 1870, 280 miles of new railroad were opened in the United Kingdom. *Herapath's Journal* says that the increase in 1871 was much less, and gives a list of the more important, varying from 1 to 17 miles in length, the aggregate of which is about 100 miles. This is in striking contrast with the 7,000 miles opened in the United States during the same period; but the fact is, Great Britain—England at least—has rather an over supply of railroads, the average percentage of profit on the capital expended being reported at 4.52 per cent. for the year 1871, when it was greater than for any previous year since 1847. And this very moderate income is not caused by excessively low rates, the cost of transportation on these railroads being usually greater than in this country. The average receipts per mile in 1871 were greater than ever before, being \$15,390 gold (counting five dollars to the pound), which is probably nearly or quite twice as great as the gross receipts per mile of American railroads; but the average cost per mile of the British roads is about \$170,000; while the average capital account (it can hardly be called cost) per mile of our railroads is probably less than \$50,000.

The total mileage of the United Kingdom at the present day is given as 14,700 miles—about one-fourth that of the United States. The total capital represented by this property is \$2,602,000,000—which may be remembered easily as being about equal to our national debt.—*Railroad Gazette.*

COMMERCE OF THE UNITED STATES.—The *New York Journal of Commerce* has compiled a statement of the total imports and exports of all the ports of the United States for the last two fiscal years, ending June 30th. Both the imports and exports are given in gold values—the imports as entered at the Custom House at their foreign gold cost, and the exports, when cleared at their currency price, reduced to their gold value by allowing the average monthly premium on gold at the port of New York. It is not a little singular to note the remarkable agreement between the outward and inward movement for the last fiscal year. The difference between the imports and exports is only about ten thousand dollars in a total of over five hundred and forty-one millions.

Imports from foreign ports at all the ports of the United States for the fiscal year:

	1870.	1871.
Dutiable Md'se...	\$415,817,537	\$483,641,966
Free goods	20,159,964	35,951,784
Gold and silver...	26,400,086	21,900,024

Total imports...\$462,377,587 \$541,493,774
Exports from the United States to foreign ports, reduced to their gold value:

	1870.	1871.
Domestic produce and md'so.	\$376,651,156	\$428,539,017
Foreign do.....	16,155,295	14,421,270
Specie and bullion.	58,155,966	98,543,885

Total exports...\$450,962,417 \$541,504,172

—The importation of foreign rails shows an increase notwithstanding the great addition made to American rail mills. The relative cheapness of foreign rails and the use of foreign capital in American roads, explain the use of foreign iron on American railways.

—Messrs. Jay Cook & Co. report the sales of Northern Pacific Railroad bonds in this country the last two days in January as having reached \$239,000, making a total for the month of \$1,513,400.

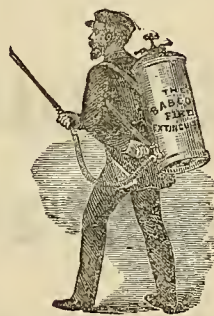
Noticing the completion of 25 miles on the western extremity from the Pacific seaboard and the anticipated early completion of 40 miles more, the *Philadelphia Press* says:

"Five years ago this feat would have been heralded in telegram and blazoned in editorial all the world over, but now dash and indomitable energy are looked upon as the ordinary commonplaces of first class railway management, and achievements such as never Xenophon or Cæsar chronicled hardly excite either surprise or remark. How tame and meagre the old Anabasis of historic immortality compared with this going up into the wilderness of our modern conquerors—the resistless advance East and West of the iron columns of industry and civilization!"

Stock of the company to the amount of \$100,000,000 has been subscribed, of which \$2,241,600 has been paid. The expenses to June 30, 1871, were: Surveys, \$379,603.11; construction, \$5,065,315.45; rolling stock, \$289,634; general expenses, \$112,318.83; total, \$4,936,871.39. The indebtedness of the company to that date was: First mortgage bonds issued, \$7,441,900; bills payable for material in transit, etc., \$1,466,116.87; due contractors, \$178,746.84; total, \$9,085,763.71.

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will contain nearly 300 pages, and about 250 fine engravings. Commencing with the number for January, every third number will contain a beautiful tinted picture on plate paper, inserted on a frontispiece.

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RAILROAD RECORD OFFICE

No. 167 Walnut Street, Cincinnati, Ohio.

The Railroad Record.

E. D. MANSFIELD, - - - - - } Editors
T. WRIGHTSON, - - - - -
A. J. HODDER, - - - - -

CINCINNATI, THURSDAY, FEBRUARY 22, 1872.

The Railroad Record.

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The Railroad System of the South which may be connected with Cincinnati.

Since there seems to be a probability that Cincinnati may realize at least a part of her scheme of Southern connection, perhaps the very first question is, what is the railroad system of the South? And with what lines may we be connected? In former articles I have endeavored to show what are the condition, population, and resources of the Southern Atlantic States, and now I will trace out their railroads, and the points connected. First, let me make a remark on some things around us, viz: You will see in the papers that the *Louisville and Nashville Railroad* have succeeded, or have a prospect of succeeding in a part of their grand scheme of cutting off from Cincinnati the advantages she expects from a "Southern road." This is extending a branch road through South-Eastern Kentucky to connect with the great Virginia and Tennessee line. For several months past the L. & N. R. R. Co. have had their bonds on the New York market for several millions of dollars. They have no doubt succeeded in getting the money. The result is that it is now announced that company will complete the residue of the road (being 166 miles) to the connection with the Virginia road at Bristol. That line will then be a trunk line through the Virginia Valley to Norfolk. So far as this passes through the South-Eastern corner of Kentucky it will take a portion of trade that might have come to Cincinnati; but in regard to Norfolk, Southern Virginia, and North

Carolina, it will have no effect; for the *Chesapeake & Ohio Railroad* will bring the trade of all that country on a shorter and better line than it can be carried to Louisville. I am afraid Cincinnati does not understand or appreciate perfectly the great future value of the *Chesapeake & Ohio* to her interests. If, as seems probable, the Dayton at Hillsboro people succeed in getting their line through to the *Chesapeake & Ohio*, then Cincinnati ought to lose no time in getting a connection at Hillsboro, or some convenient point on the line. But of this I need not speak here. Let us look at the Southern roads ahead and made. Supposing a direct road to Chattanooga, as contemplated, then the Southern connections stand thus:

1. Of South Carolina:	miles.
Atlanta to Augusta (Georgia R. R.)	171
Augusta to Charleston (S. C. R. R.)	137
Augusta to Columbia.....	85
Columbia to Greenville.....	143
Columbia to Branchville.....	68
Charleston to Cheraw.....	142
Columbia to Charlotte.....	107
Total.....	753

These roads you perceive go to every important point in South Carolina, and this connection is made through Augusta on the Savannah River. South Carolina, as I showed in a former article, has but 24,500 square miles—less than two-thirds of Ohio—and while this 750 miles seems comparatively small, it is nevertheless quite sufficient to make a connection with every commercial point in the State. Outside of Charleston and Columbia there is not a town of 3,000 inhabitants in the State. I will not give the railroads of North Carolina because the shortest connection with them will be through the *Chesapeake & Ohio Railroad*.

2. Of Georgia. Taking Chattanooga as the central point we have first the "Georgia road" as in the last section:

	miles.
Atlanta to Augusta.....	171
Augusta to Savannah.....	132
Chattanooga to Atlanta.....	138
Atlanta to West Point.....	87
Atlanta to Richmond.....	53
Atlanta to Macon.....	103
Macon to Millen.....	111
Marion to Brunswick.....	186
Marion to Eufaula, (Alabama).....	144
Rome to Kingston.....	20
Total.....	1,145

There is also a branch road to Columbia (Georgia) which should be included. Thus we see that 1,200 miles of road in Georgia connecting with Atlanta, connects the Chattanooga road with every principal point in Georgia. Perhaps it would be interesting and proper to this part of the subject to show what are the principal towns in Georgia and how these roads connect them. I confess I am a little disappointed, on looking into the census for 1870, to find these Southern towns so comparatively small. Those of Georgia, however,

are in the aggregate much more populous and important than those of South Carolina. The following are the principal towns of Georgia:

Savannah.....	28,235
Atlanta.....	21,789
Augusta.....	15,389
Macon.....	10,810
Columbus.....	7,401
Rome.....	2,748
Milledgeville.....	2,750
Brunswick.....	2,348

It will be seen that Georgia, called in the South the "Empire State of the South," has less than 100,000 people in all its towns; for all, except the above are quite small. The railroads I have above described pass through the whole of them, and thus a road centering at Chattanooga will touch all of them.

3. Of Florida. The part of Florida which is reached by railroads is comparatively small, but it is all that it is worth while to reach. The following are the roads which reach the main points in Florida:

	miles.
Fernandina to Cedar Keys.....	154
Jacksonville to Tallahassee.....	189
Lawton to Live Oak.....	48
Total.....	391

These roads lead from Savannah and Jacksonville to the principal parts of Florida.

We will now look at the Alabama connections, which in some respects are the most important. These are:

	miles.
Chattanooga, Tuscaloosa, & Meridian	295
Selma, Rome, & Dalton.....	236
Selma & Suez.....	35
West Point & Montgomery.....	138
Montgomery & Mobile.....	186
Total.....	886

The first of these roads will make the shortest and best route from Cincinnati to New Orleans, and the last will make the best to Mobile. We have then in these four States (South Carolina, Georgia, Florida, and Alabama) disregarding all merely local and minor roads, the following summary of main lines of road connecting Cincinnati with all the principal cities and business places of the South:

	miles.
In South Carolina.....	753
In Georgia.....	1,145
In Florida.....	391
In Alabama.....	886
Total.....	3,175

In addition to this aggregate of main lines, there are at least 2,000 miles more of subsidiary lines, so that, on condition that the Southern road (as I have already said) shall be managed to do the same work for the same money, that Northern roads do, Cincinnati may send her products and merchandise to every town in the South in the shortest time and the least cost.

E. D. M.
Aiken, S. C., Feb. 16, 1872.

The Ohio River and Railroads.

Statistics show that the trade of the Ohio River amounts to the enormous sum of \$720,000,000 per annum. Of this amount, as nearly as can be ascertained, there belongs to the city of Cincinnati about \$315,000,000; Pittsburg, \$152,000,000; Wheeling, \$29,000,000.

This vast business is done with the ordinary commercial profits, when there is ten months of fair river navigation. If the river could be relied upon for the whole year, even with the transfers from large to small boats, it is estimated that it would not only be increased, but that it could be done at greater profits and less risks to all the parties concerned. But in proportion as the river fails for any part of these ten months, does the river business suffer? that is to say, the commercial affairs of the country supplying this great traffic are unfavorably affected, and as it is made up from the products and labor of all the people inhabiting this section of country, all are more or less injured, so intimately are the business interests of the people connected. The occasional prosperity of one class by the misfortunes of others, are usually quite trivial and always temporary. The great law of compensation comes in, and with unerring certainty and overwhelming power corrects these differences, and sometimes produces most fatal reactions. Every sagacious business man now sees his prosperity in that of the people, and knows, that in a given period where all interests are flourishing, his under proper management, must grow brighter and better than by any other means. The failure therefore, for any considerable time, of this thoroughfare that is demanded, even in the partially developed condition of the country that it supplies, for the yearly transit of \$720,000,000 worth of business is such a general calamity as to excite alarm, and to cripple and check the energies of the people. How this can be avoided is a most serious question, one upon which the future prosperity of a large portion of five States depends, and one that must be met speedily. There can be no standstill upon this matter. The spirit of improvement is so active in the country, and particularly in the West, that new territories and States are outstripping older ones in the race for power and wealth, though they do not possess half the natural resources, nor lie in such advantageous geographical positions. Several of the new States without the benefits of a grand river, such as the Ohio, are going ahead of their sister sovereignties that have relied upon this outlet, and regarded it as one that was necessary and equal to any demands that would be made upon it. They have supplied this want with railroads, which run the whole year, and that by reason of their speed and connections are stimulating the business of the country they supply, and producing that high and general

prosperity so notorious in our new States, and also wanting in some of our older and more favored ones.

Two months stoppage of business upon any line of railroad would create a panic from one end of it to the other. A few days blockading by snow of the Union Pacific road, although for hundreds of miles along its line there is not resident in the country a man to each mile, has had more to do with securing government subsidies and popular sympathy for the construction of two other Pacific roads than anything else. It is the knock down argument against the efforts the powerful managers of the Union Pacific road have made to prevent the construction of rival lines.

It then, this is the feeling, where commerce is checked for a few days only, and these the efforts to avoid a recurrence of such a misfortune, where people have enjoyed the benefits of uninterrupted communication with the world, and that steadiness in business that only certainty can give, what would they do if they were annually cut off two months, and when their traffic reached up to the enormous sum of \$720,000,000, and with capacities to reach a thousand millions of dollars per annum? Embarrassing as this may seem, let us ask, what would be the consequences if they were thus cut off in their business facilities for eight months out of the twelve? Business men living upon a line of railroad, can hardly conceive of such a condition. It puts them back to the days of Concord coaches, Conestoga wagons, and river push boats. And yet, the people of this Ohio river country, whose trade under such unfavorable conditions is reaching rapidly up to eight millions of dollars per annum, have been practically without the means of transportation for eight months during the past twelve, and to-day the river is not yet free for safe transit. All through the hot dry months of last summer the river showed its sand bars and settled lower and lower until the smallest craft, made to navigate the creeks that feed this stream, could hardly wriggle their way through, and were such masters of their situation, that they revelled in the wages of extortion for the poorest of service. And even they were finally compelled to "lay up," and await the *extra deus* that might dampen the sand bars sufficiently to let them slip over. And when rains of autumn fell, and the waters rose again, and the United States, and the Bostona all tricked out anew, started again, the hopes of business men revived. But a few short days and nights passed before Jack Frost chained up this mighty river, and made it worse for commerce than even the fierce rays of old Sol. And so it has continued even unto this day, with probably a provoking exception of a day or two. Surely old John Randolph's declaration about this stream, has been nearly verified, "that it was dry six months, and frozen

up the other six months of the year, and no much account for business anyhow."

In the mean time let us ask what effect has this eight months of suspension had upon the \$720,000,000 that was awaiting the movement of the waters? How has the prosperity of Cincinnati been effected by this check upon her \$315,000,000? Who can tell the commercial disturbances this misfortune has created in the country depending upon this vast trade? No, this sort of thing will not do. Neither capital, nor brains, nor skill, nor experience can be induced to take risks where no better opportunities are to be found, and without these, towns will not grow, nor wealth increase very rapidly, nor the wonderful resources that lie undisturbed along the river shore be brought into requisition, to swell these millions of dollars, and make glad the hearts of the hundreds of thousands of busy workmen who would create them like magic into new values.

But suppose, that in addition to this river, this rich country was supplied with railroad facilities as Illinois, and Iowa and Kansas, now are, what would be the result? The whole condition of things would change. The river would do none the less, when it is capable of doing anything, than it now does. The new and modern improvement would make its own business, and when another unhappy period of eight month's stagnation falls upon it, and the expected annual two month's suspension occurs, it would relieve this part of the country from its embarrassments and sustain its prosperity.

We have written too much now to follow this matter out. To the investigating mind the whole subject will be presented, and we think it will be apparent, that good as the river has been, good as it may be, both as a means of transit for heavy and slow freight, and as a wholesome check upon the demands of a railroad corporation, that it will not do to build up the country, call into requisition the industrial elements that are so valuable and abundant, command capital from other and better supplied localities, and that to grow as other parts of the country are growing, something else must be done than to rely wholly on "*La Belle Rivere*."

The Babcock at Work Again.

A DESERVED TRIBUTE.

(From the Chicago Tribune, Nov. 10, 1871.)

At about noon, on Monday last, a tar boiler caught fire at Bowen Bros. establishment, corner of Michigan avenue and Madison street, and had already spread to the adjoining sheds, when Edwin Hunt & Sons, of No. 147 Michigan avenue, sent down one of their Babcock Extinguishers, and the fire was immediately extinguished, and a large amount of property saved.

The Chicago Extension of the C. & O. R. R.

We learn that the amount of money demanded by the C. & O. Company, to extend their line from the mouth of Syme's creek, just across the Ohio river from the town of Huntingdon, to Hillshoro and Dayton, is so nearly raised that it may be considered a certainty, and that within a few weeks the engineers will be placed upon the line to make a final location, and as soon as possible thereafter, the work will be put under contract, and pushed through with the energy that has given the public so much confidence in the managers of the C. & O. scheme.

This will be a splendid local road, to say nothing about the part it may play in a Chicago connection, for the new outlet to tide water. We have no idea that this important thoroughfare will stop long at Dayton. It will be pushed through, either by a new road, or such combinations with old ones as will answer the same purpose, and as will give it a line to Chicago, and the principal intermediate points, quite as good as that possessed by any of the competing companies.

By this route a practical Cincinnati connection may be made. From Hillshoro, an excellent line can be found through a good and densely populated country, and with easy grades to a connection with the Baltimore and Ohio extension into this city, and from which a short and direct entry into Cincinnati can be made by the tunnel, when this important and much needed work is finished. Either of these courses into this city would give the C. & O. the advantage of connections with both ends of Cincinnati,—and the roads leading westward and southward. Like all the other great East and West lines, this one must find the three commercial centres of the West, viz: Cincinnati, St. Louis and Chicago, and this is probably as good a way to work out this result as any now open.

GLASS MADE DIRECTLY FROM GRANITE—The *Baltic Journal* reports that there exists near several cities of Finland a kind of granite called Cupakivi, of which the composition is this: Silica, 74 per cent.; feldspar, 12; oxide of iron, 3; lime, 1; alkalies, with traces of magnesia, 9. This being evidently a good compound to make glass, the first experiment was consequently made by melting 500 parts granite and 200 limestone, and a white glass was obtained. The second experiment was made with 500 granite, 150 lime and 75 of soda. This glass was more fusible, and at the same time harder. Both kinds were blown without difficulty, at a bright red heat, while a dark glass was made by the addition of 70 parts of sulphate of lime or potash, and 7 parts of carbon. As there is no doubt that on our continent there is granite of a similar composition, we throw this communication out as a hint to those interested.

The Secretary of the Treasury will sell \$2,000,000 in gold and buy \$3,000,000 in bonds during February.

THE FERGUSON RAILROAD LAW.**DECISION OF THE SUPREME COURT IN FULL****AN IMPORTANT LEGAL DOCUMENT.**

No. 432. J. Bryant Walker, Solicitor of the City of Cincinnati, vs. the City of Cincinnati and others.

SCOTT, J.

The question presented by this case is as to the constitutionality and validity of the act of the General Assembly of this State, passed March 4, 1869, entitled, "An act relating to cities of the first class having a population exceeding one hundred and fifty thousand inhabitants."

The general scope and purpose of the act is to authorize any such city to construct a line of railroad leading therefrom to any other terminus in this State or in any other State, through the agency of a Board of Trustees consisting of five persons, to be appointed by the Superior Court of such city, or if there be no Superior Court of such city, then by the Court of Common Pleas of the county in which such city is situated. The enterprise can not, however, be undertaken until a majority of the City Council shall, by resolution, have declared such line of railway to be essential to the interest of the city, nor until it shall have received the sanction of a majority vote of the electors of the city, at a special election to be ordered by the City Council, after twenty days' public notice.

For the accomplishment of this purpose the Board of Trustees is authorized to borrow a sum not exceeding ten millions of dollars, and to issue bonds therefor in the name of the city, which shall be secured by a mortgage on the line of railway and its net income, and by the pledge of the faith of the city, and a tax to be annually levied by the Council, sufficient with such net income to pay the interest and provide a sinking fund for the final redemption of the bonds.

In pursuance of the authority which this act purports to give, the City Council of Cincinnati has resolved that it is essential to the interests of that city that a line of railway to be named "The Cincinnati Southern Railway" shall be provided between the said City of Cincinnati and the City of Chattanooga, in the State of Tennessee, and this action of the Council has been indorsed and approved by a vote of more than ten to one of the electors of the city at an election duly ordered and held pursuant to the requirements of the act. But fifteen hundred of the electors of the city voted against the proposed project, and the grave question here presented, on behalf of these unwilling electors and tax payers, is whether it is within the power of the State Legislature to authorize the taxation of their property by the municipality for the purpose of constructing such a line of railway by the means and in the manner prescribed in the act. The consequences which may reasonably be expected to result from the exercise by municipal corporations of powers such as this act purports to confer, both in respect to public and private interests, are so momentous as to make it difficult to over-estimate the importance of the question, and to demand at our hands the most careful investigation and deliberate consideration. This is the first instance in the history of the State, so far as we are aware, in which the General Assembly has undertaken to authorize municipalities to embark in the business of constructing railroads, on their own sole account, as local improve-

ments. The railway contemplated in this instance is several hundred miles in length, extending into other States; the sum authorized to be expended in its construction is a large one, and should it prove inadequate for the completion of the road, we may reasonably expect it to be increased by subsequent legislation. These considerations, and the apparent abuse of discretion involved in declaring such a work to be so far local in its character as to justify its construction by a single city, at the sole expense of its citizens, all give a high degree of interest to the question. But we must bear in mind that the question is one of legislative power, and not of the wisdom, or even of the justice of the manner in which that power, if it exists, has been exercised. Had we jurisdiction to pass upon the latter question we should probably have no hesitation in declaring the act under review to be an abuse of the taxing power. Let us, then, first enquire under what conditions it becomes competent for the judiciary to declare an attempted act of legislation, formally enacted by the General Assembly, to be invalid, by reason of unconstitutionality. Courts can not, in our judgment, nullify an act of legislation on the vague ground that they think it opposed to a general "latent spirit," supposed to pervade or underlie the Constitution, but which neither its terms nor its implications clearly disclose in any of its parts. To do so would be to arrogate the power of making the Constitution what the court may think it ought to be, instead of simply declaring what it is. The exercise of such a power would make the court sovereign over both Constitution and people, and convert the government into a judicial despotism. While we declare that legislative power can only be exercised within the limits prescribed by the Constitution, we are equally bound to keep within the sphere allotted to us by the same instrument. On this subject we can not do better than to adopt what is so well said by Judge Cooley in his treatise on "Constitutional Limitations," pp. 128, 129, when in speaking of limitations upon legislative authority, he says: "Some of these are prescribed by constitutions, but others spring from the very nature of free government. *The latter must depend for their enforcement upon legislative wisdom, discretion, and conscience.* The Legislature is to make laws for the public good, and not for the benefit of individuals. It has control of the public moneys, and should provide for disbursing them for public purposes only. Taxes should only be levied for those purposes which properly constitute a public burden. But what is for the public good and what are public purposes, and what does properly constitute a public burden, are questions which the Legislature must decide upon its own judgment; and in respect to which it is vested with a large discretion which can not be controlled by the courts, except, perhaps, where its action is clearly evasive, and where, under pretense of lawful authority, it has assumed to exercise one that is unlawful. Where the power which is exercised is legislative in its character, the courts can enforce only those limitations which the Constitution imposes, and not those implied restrictions which, resting in theory only, the people have been satisfied to leave to the judgment, patriotism, and sense of justice of their representatives.

And he adds on page 171:

"Nor are the courts at liberty to declare an act void because, in their opinion, it is opposed to a spirit supposed to pervade the Constitution, but not expressed in words." Citing *people vs. Fisher*, 24 Wend., 220; *Cochran vs.*

Van Surley, 20 Wend, 381; *People vs. Gallagher*, 4th Mich., 244; *Benson vs. Mayor of Albany*, 24th Barb., 252; *Grant vs. Courter*, 24th Barb., 232; *Wynshamer vs. People*, 13th N. Y., 391.

We do not understand it to be claimed that the act in question is an assumption of any of the powers specially delegated to the general government by the Constitution of the United States, nor that it is an encroachment upon the functions and powers conferred by the State Constitution upon other departments of the government, and therefore impliedly withheld from the General Assembly. The only questions, therefore, with which we have to deal are: First, whether the act is within the general grant of legislative power which the Constitution declares to be vested in the General Assembly; and, second, does it contravene any of the limitations upon the exercise of legislative power, which are either expressed or clearly implied in any of the provisions of that instrument. And before we can answer the former question in the negative, or the latter in the affirmative, our convictions must be clear and free from doubt. [*Lechman vs. McBride*, 15 O. St., 291; *C. W. & Z. R. R. Co. vs. Commissioners of Clinton County*, 1 O. St., 77, and authorities there cited.]

Let us then consider, first, whether this act is within the general scope of legislative power, independent of special constitutional prohibitions. That it is within the legitimate scope of legislative power to authorize a municipality of the State to aid in the construction of a public improvement such as a railroad, by becoming a stockholder in a corporation created for that purpose, and to levy taxes to pay the subscription, must be regarded as fully settled in this State by repeated adjudication. In the case of *C. W. & Z. R. R. Co. vs. Commissioners of Clinton County*, 1st O. St., 77, the subject was very fully considered, and it was held that, as the State may itself construct roads, canals, and other descriptions of internal improvements, so it may employ any lawful means and agencies for that purpose, among which are private companies incorporated for the construction of such improvements. And it was said that, for much stronger reasons, counties might be authorized to construct works of a similar kind, of a local character, having a special relation to their business and interests.

And as the State might contract or authorize the counties to construct these works entire, or create corporations to do it entire, it was held that, as a question of power, each might be authorized to do a part. The validity of subscriptions to the stock of railroad corporations, made by counties, cities, towns, and townships of the State, under special legislative authority, has been drawn in question in many cases which have since come before this court, and in none of them has the authority of the Legislature to grant such power of subscription been doubted. 1 O. St. 105; Id. 153; 2d O. St. 607; Id. 647; 6 O. St. 280; 7 O. St. 327; 8 O. St. 394; Id. 564; 11 O. St. 183; 12 O. St. 596; Id. 624; 14 O. St. 260; Id. 472; Id. 569, and the cases in which such legislative authority has been upheld by the courts of last resort in other States are too numerous even for reference. A list of more than fifty such cases may be found in Judge Cooley's treatise before referred to, p. 119, note 4.

If we even admit that all these decisions have been unwise, yet it is clearly too late to overrule them in this State. Were the question a new one, and properly determinable by

the judgment of a court, we should perhaps concur in opinion with Judge Redfield, that subscriptions for railway stock by cities and towns do not come appropriately within the range of municipal powers and duties. Yet he is constrained to add that "the weight of authority is all in one direction, and it is now too late to bring the matter into serious debate." 2 Redfield on Railway 398, 399, note. And if in the absence of constitutional prohibitions, a municipal corporation may be authorized to aid by stock subscriptions in the construction of a railway, which has a special relation to its business and interests, upon what principle shall we deny that it can be authorized to construct it entirely at its own expense, when its relation is such as to render it essential to the business interests of the municipality? And upon the question of fact, whether a particular road is thus essential to the interests of the city, this court, in the case of the *C. W. & Z. R. R.* already referred to, quote approvingly from the case of *Goodin vs. Crump*, 8 Leigh, R. 120, in which it was said: "If, then, the test of the corporate character of the act is the probable benefit of it to the community within the corporation, who is the proper judge whether a proposed measure is likely to conduce to the public interest of the city? Is it this court, whose avocations little fit it for such inquiries? Or is it the mass of the people themselves—the majority of the corporation acting (as they must do if they act at all) under the sanction of the legislative body? The latter assuredly."

And in *Sharpless vs. the Mayor of Philadelphia*, 21st Pa. St. R. 147, it was said by C. J. Black: "If the Legislature may create a debt, and lay taxes on the whole people to pay such subscriptions, may they not with more justice and greater propriety, and with as clear a constitutional right, allow a particular portion of the people to tax themselves to promote in a similar manner a public work in which they have a special interest? I think this question can not be answered in the negative * * * I can not conceive of a reason for doubting that what the State may do in aid of a work of general utility, may be done by a county or a city for a similar work, which is especially useful to such county or city, provided the State refuses to do it herself and permits it to be done by the local authorities." The question in that case was upon the validity of subscriptions of stock made by the city of Philadelphia in aid of two railroads. One of these was the *Hempfield road*, which had its eastern terminus at *Greensburg*, three hundred and forty-six miles west of Philadelphia. Both subscriptions were sustained, and the Court said: "It is the interest of the city which determines the right to tax her people. That interest does not necessarily depend on the mere location of the road. * * * But it is not our business to determine what amount of interest Philadelphia has in either of these improvements. That has been settled by her own officers and by the Legislature. For us it is enough to know that the city may have a public interest in them, and that there is not a palpable and clear absence of all possible interest perceptible by every mind at the first blush. All beyond that is a question of expediency, not of laws, and much less of constitutional law." By the act under consideration no railroads are authorized to be constructed, except such as have one of their termini in the city which constructs them. And that a city has no peculiar corporate interest in such channels of commerce as lead directly into it, is a proposition which, to say the least, is very far from being clearly true. And as the

public or corporate interest in an improvement rather than its particular location determines the question as to the right of taxation for its construction, the fact that the road contemplated in the present case will lie mainly outside of this State can make no difference. The right of eminent domain can not be exercised, nor the road constructed in or through other States, without their permission and authority; and the act in question contemplates nothing of the kind. But when such consent is given we suppose the particular direction given to the road can have no bearing on the question of corporate power to construct it. It is also to be borne in mind that this is not a case in which the Legislature has determined a particular public improvement to be of a local character, and has imposed the burden of its construction on an unwilling municipality. But it is the case of an authority given to a city to exercise its powers of taxation only for the construction of an improvement which the local authority have declared to be essential to the interest of the city, and even that can not be done till a majority of its people have sanctioned the measure by their deliberate votes.

The towns and cities of the State are not the creation of the Constitution. It recognizes these municipalities as existing organizations, properly invested by immemorial usage with powers of assessment and taxation for local purposes of a public character, but which were, nevertheless, subject to control and regulation by the State, and that these powers might be abused unless properly restricted. The Constitution itself provides where the power of preventing such abuse shall be vested. It declares, in Article 13, Section 6, that "the General Assembly shall provide for the organization of cities and incorporated villages by general laws, and restrict their power of taxation assessment, borrowing money, contracting debts, and loaning their credit, so as to prevent the abuse of such power."

It is very clear that this constitutional mandate can not be enforced according to judicial discretion and judgment. In the very nature of the case, the power which is to impose restrictions so as to prevent abuse, must determine what is an abuse, and what restrictions are necessary and proper. As is said by the learned author from whose treatise we have before quoted, "The moment a court ventures to substitute its own judgment for that of the Legislature, in any case where the Constitution has vested the Legislature with power over the subject, that moment it enters upon a field where it is impossible to set limits to its authority, and where its discretion alone will measure the extent of its interference. The rule of law upon this subject appears to be that, except where the Constitution has imposed limits upon the legislative power, it must be considered as practically absolute, whether it operates according to natural justice or not in any particular case. The courts are not the guardians of the rights of the people of the State, except as those rights are secured by some constitutional provision which comes within the judicial cognizance. The protection against unwise or oppressive legislation, within constitutional bounds, is by an appeal to the justice and patriotism of the representatives of the people. If this fail, the people in their sovereign capacity can correct the evil; but courts can not assume their rights." Cooley's Const. Lim. 167, 168.

We do not mean to say that every legislative enactment is necessarily valid, unless it conflict with some express provision of the Constitution. Undoubtedly the General As-

sembly cannot divest A of his title to property and give it to B. They cannot exercise judicial functions. They can impose taxes only for a public purpose. For it is of the essence of a tax that it be for a *public use*. Nor can they, by way of taxation, impose a burden upon a portion of the State only, for a purpose in which that portion of the State has no possible peculiar local interest. But to justify the interference of a court upon any of these grounds, the case must be thought clearly, and beyond doubt, within the category claimed, and such we are persuaded is not the case in respect to the act in question.

We have been referred to recent adjudications in several States, which are supposed to sustain the claim that taxation can not be authorized for the construction of a railroad in cases like the present. In the case of *Whitting vs. Sheboygan Railway Company* (9 American Law Reg., 156) it was held that "a statute levying a tax for the sole purpose of making a direct gift of the money raised to a mere private railway, in which the State or the tax payers have no ownership, is unconstitutional."

In the case from Michigan, of the *People ex rel. the Detroit and Howell Railway Company vs. Township of Salem*, proceeds upon the same grounds. But in the case now before us, the road is the property of the tax payers who furnish the means to build it. The recent decisions in Iowa are in conflict with the former uniform line of decisions on the subject in the same State, and in all the cases referred to in either of those States the reasoning upon which the decisions rest is in conflict with what we can not but regard as the settled law of this State.

We are brought to the conclusion that there is nothing in the general purport and main object of this act which places it outside of the sphere of legitimate legislative power. We proceed to consider whether it is in conflict with any of the express limitations imposed by the Constitution. It is claimed that the General Assembly, in the act in question, by authorizing the Judges of the Superior Court to appoint Trustees of the contemplated railway, have exercised an appointing power which is forbidden by the 27th section of the second article of the Constitution. The argument is, that the Trustees whom the act authorized the court to appoint are *public officers*; that their appointment is not the exercise of a judicial function, or of any power that can be conferred on the Judges of the court *as such*, and that the conferring of this power of appointment is the creation of a new and independent office, which cannot be filled by the appointment of the Legislature, whether the appointment be designated by name, or by reference to another office which he holds. In the same connection it is claimed that this power of appointment is conferred on the Judges of the Superior Court in violation of Art. 4, Sec. 14 of the Constitution, which prohibits the Judges of the Supreme Court and the Court of Common Pleas from holding any other office of profit or trust under the authority of this State or the United States. And it is further argued that the act is in conflict with Art. 2, Sec. 20 of the Constitution, because it does not fix the term of office and compensation of the Trustees. Are any of these positions clearly well taken?

We shall first inquire whether the power of appointment conferred by this act on the Judges of the Superior Court involves the exercise of an appointing power by the General Assembly. Were the Judges thereby appoint-

ed to a public office? In support of the affirmative of this question, we are referred to the decision of this court in the case of the State on relation of the Attorney-General vs. Kennon et al., 7 O. St. R., 546. In that case it was held that the selection and designation by name of the defendants by the General Assembly to exercise continuously and as a part of the regular and permanent administration of the government important public powers, trusts, and duties is an appointment to office. But we think the present case can not be brought within the principle of that decision. In this case there is no designation of individuals by name to exercise any public functions whatever. It is clearly the case of an additional power or duty annexed to existing offices, and not the creation of a new office. Upon the filing of a petition by the City Solicitor in the Superior Court, praying for the appointment of Trustees, it is made the duty of the Judges of that court to make such appointment, and to enter the same on the minutes of their court. The power of appointment and of subsequent removal for unfaithfulness can be exercised only by the court *as such*, and all power of control in the premises on the part of the Judges ceases with the termination of their judicial offices. It is true that the act confers a new power on the Judges of the Superior Court, but, as was said by Judge Swan in his concurring opinion in the case referred to, "if adding to the duties or powers of existing offices is an exercise of the appointing power, then every new duty required or power conferred upon any State, county, or township officer must be deemed the exercise by the General Assembly of the appointing power, and forbidden by the Constitution."

But it is said that the appointment of these Trustees is not the exercise of a judicial function. Suppose this to be so. Does it follow that no functions except such as are purely judicial can be constitutionally annexed to the office of a Judge? Can judges not be made conservators of the peace, and as such be required to discharge duties which are not of a judicial character? If no power of appointment to any office or position of public trust can be devolved upon a court or judge, it is certain that many of the statutes of this State are invalid. Quite a number of statutes have been referred to by counsel in which such power of appointment is given to Probate Judges, Judges of the Court of Common Pleas, and Judges of the Superior Court. But is it clear that the selection and appointment of these Trustees which the act requires to be made by the Judges of the Superior Court, and to be entered on the minutes of the court, is in no sense a judicial act? It is the act of a court, and the selection of the Trustees, and the fixing the amount of their bonds require the exercise of judgment and discretion. Authorities are not wanting to show that such an act is properly judicial in its character.

Thus where a statute of New York authorized a town to issue bonds to aid in the construction of a railroad, and make it the duty of the County Judge to appoint under his hand and seal three commissioners to carry into effect the purposes of the act, it was held by the Supreme Court of that State, that the act of making such appointment was judicial.

It was said by the Court: "The action sought from the County Judge is judicial. It is conferred by the statute upon the office of County Judge to be exercised under its seal. The duty requires the exercise of judgment

and discretion in the selection of Commissioners. The individual is in no way responsible for any act of those he may select in the discharge of their duties. In no sense is the act of selecting commissioners ministerial.

"They do not act on the command of the County Judge. He issues no process to them. If after appointment the person designated accept and act, they do so under and by virtue of the statute, and not in virtue of the order designating them as Commissioners." Sweet vs. Hulbert, 51 Barb S. C. Rep. 315. Nor do we think that these Trustees are *officers* within the meaning of that clause of the Constitution, which provides that, "The General Assembly, in cases not provided for in this Constitution, shall fix the term of office and the compensation of all officers."

This clause cannot be regarded as comprehending more than such offices as may be created to aid in the permanent administration of the government. It can not include all the agencies which the General Assembly may authorize municipal and other corporations to employ for local and temporary purposes. These Trustees have no connection with the government of the State, or of any of its subdivisions. They have nothing to do with the general protection and security of persons or property. Their sole duty is to procure and superintend the construction of a particular road, and to lease it, when constructed. When this shall have been done, so far as appears from the act, their functions end. And in the road, when constructed, the State will have no proprietary interest. All the railroads of the State, though owned and operated by private corporations, are in an important sense public improvements, yet the officers who manage them and superintend their pecuniary interests are not public officers, within the meaning of this constitutional provision. No one supposes that the compensation of such officers must be fixed by the Legislature.

It remains to consider with reference to the general purpose and object of the act, whether there are in the Constitution special limitations on the general legislative power vested in the General Assembly which prohibits the authorizing of a city to raise, by taxation of its citizens, the means for constructing a railroad leading into such city, when such an improvement is deemed by a majority of the citizens to be essential to its interests. It is claimed that the grant of such authority is in violation of article 8, section 5 of the Constitution, which reads as follows:

Art. VII, Sec. 6.—The general Assembly shall never authorize any county, city, town, or township, by vote of its citizens, or otherwise, to become a stockholder in any joint stock company, corporation, or association whatever; or to raise money or loan its credit to, or in aid of, any such company, or corporation, or association.

It is proper to consider this section in connection with the sections which precede it in the same article, and with some provisions found in either articles which bear more or less directly upon the same and kindred subjects.

The first two sections of this article enumerate the purposes for which the State may contract debts, and the third section declares that except the debts thus specified, "no debt whatever shall hereafter be created by or on behalf of the State." The fourth section declares that "the credit of the State shall not, in any manner, be given or loaned to, or in aid of, any individual, association, or corporation whatever, nor shall the State ever hereafter be-

come a joint owner or stockholder in any company or association, in this State or elsewhere, formed for any purpose whatever." The fifth section forbids the assumption by the State of the debts of any county, city, town, or township, or of any corporation whatever, unless such debts shall have been created to repel invasion, suppress insurrection, or defend the State in war. In article 12, section 6, it is declared "the State shall never contract any debt for purposes of internal improvement."

And article 13, section 6, provides as follows: "The General Assembly shall provide for the organization of cities and incorporated villages by general law, and restrict their powers of taxation, assessment, borrowing money, contracting debts, and loaning their credit, so as to prevent the abuse of such power." In *Cass vs. Dillon*, 2 O. St. Rep. 613, 614, it was held, and we think properly, that the limitations imposed upon the State by the first three sections of article 8 were not intended as limitations upon her political subdivisions, her counties and townships. And the clear implications of the fifth section are that counties, cities, towns, and townships may create debts to repel invasion, suppress insurrection, or defend the State in war, which the State may assume; and may also create debts for other purposes, which the State is forbidden to assume. By the fourth section a limitation is imposed in respect to the State, similar to that prescribed in the sixth section in regard to counties, cities, towns, and townships. The State and her municipalities and subdivisions are clearly distinguished, and treated of separately. It is to the latter that the inhibitions of the sixth section relate. What are the extent and purport of those inhibitions? Its own language must furnish the answer to this question, if that language be plain and unambiguous. Of course, I do not mean that we are bound to adhere strictly to the letter, without regard to the evident meaning and spirit of the instrument.

The fundamental law of the State is to be construed in no such narrow and liberal spirit. On the contrary, it is to be construed according to its intention where that is clear, and that which clearly falls within the reason of the prohibition may be regarded as embodied in it. Still it is very clear that we have no power to amend the Constitution, under the color of construction, by interpolating provisions not suggested by the language of any part of it. We can not supply all omissions, which we may believe have arisen from inadvertence, on the part of the Constitutional Convention. Recurring, then, to the language of this section, it is quite evident that it was not intended to prohibit the construction of railroads, nor, indeed, to prohibit any species of public improvements.

The section contains no direct reference to railroads, nor to any other special class of improvements or enterprises. The inhibitions are directed only against a particular manner or means by which, under the Constitution of 1802, many public improvements had been accomplished. And its language is sufficiently comprehensive to embrace every enterprise involving the expenditure of money and the creation of pecuniary liabilities. Under the Constitution of 1802 numerous special acts of legislation had authorized counties, cities, towns, and townships to become stockholders in private corporations organized for the construction of railroads, to be owned and operated by such corporations. The stock thus subscribed by the local authorities was generally authorized to be paid

for by the issue of bonds, which were to be paid by taxes assessed upon the property of their constituent bodies. Many of these enterprises proved unprofitable, and the stock became valueless. Some of them wholly failed. Heavy taxation followed to meet and discharge the interest and principal of the bonds thus issued. Towns and townships were induced to attempt repudiation of their contracts.

And as the records of this court abundantly show, the assessment and collection of the taxes which the preservation of good faith required, had repeatedly to be enforced by mandamus. In many, if not all of these cases, it was alleged that the stock subscriptions sought to be enforced had been voted for and made under the influence of false and fraudulent misrepresentations made by interested officers and agents of the corporation to be added by the subscription. At the time of the formation and adoption of the present Constitution, these evils had begun to be seriously felt, and excited the gravest apprehensions of calamitous results. Under such circumstances, this section was made a part of the State Constitution.

It may be well again to recur to its language: "The General Assembly shall never authorize any county, city, town, or township by vote of its citizens or otherwise, to become a stockholder in any joint stock company, corporation, or association whatever; or to raise money for, or loan its credit to, or in aid of, any such company, corporation, or association."

The mischief which this section interdicts is a business partnership between a municipality or subdivision of the State and individuals, or private corporations, or associations. It forbids the union of public and private capital, or credit, in any enterprise whatever. In no project originated by individuals, whether associated or otherwise, with a view to gain, are the municipal bodies named permitted to anticipate in such manner as to incur pecuniary expense or liability. They may neither become stockholders, nor furnish money or credit for the benefit of the parties interested therein. Though joint stock companies, corporations, and associations only are named, we do not doubt that the reason of the prohibition would render it applicable to the case of a single individual. The evil would be the same whether the public suffered from the cupidity of a single person or from that of several persons associated together.

As the alliance between public and private interests is clearly prohibited in respect to all enterprises of whatever kind, if we hold that these municipal bodies can not do on their own account what they are forbidden to do on the joint account of themselves and private partners, it follows that they are powerless to make any improvement, however necessary, with their own means, and on their own sole account. We may be very sure that a purpose so unreasonable was never entertained by the framers of the Constitution.

Besides, if this section is to be construed so as to prohibit municipal corporations from making improvements on their own account and with their own means, then the fourth section of this same article, which is quite similar in language, must be held to prohibit the making of any improvements by the State, on her own account and with her own means. This would not only be highly unreasonable, but would conflict with the clear implications of the section which prohibits the State from *contracting any debt* for the purposes of internal improvements.

This implies that the State may make all such improvements as will not involve the creation of a debt.

We find ourselves unable, therefore, upon any established rules of construction, to find in this section the inhibition claimed by counsel to arise by implication.

It may be, and indeed I think it very probable, that had the framers of the Constitution contemplated the possibility of the grant to a municipal corporation of such powers as the acts under consideration confer, they would have interposed further limitations upon legislative discretion.

But omissions of such a great character surely can not be supplied according to the conjectures of a court.

It is agreed, however, that the Trustees of the contemplated railway are a corporation, and that the act in question violates the terms of this section, by authorizing the city to raise money for and loan its credit to this corporation, to enable them to construct a railroad.


We think it unnecessary to inquire whether the Trustees provided for by the act are in any sense a corporation or not. For if they are an association or organization of any kind whatever, having a property interest in the road distinct from that of the city, then the objection is well taken. The inhibitions of this section are not directed against names,

But it is clear that these Trustees are a mere agency through which the city is authorized to operate for her own sole benefit. Neither as individuals, nor as a board, have they any beneficial interest in the fund which they are to manage, or in the road which they are to build.

They are *in fact*, as well as *in name*, but *Trustees*, and the sole *beneficiary* of the trust is the city of Cincinnati. They are authorized to act only in the name and on behalf of the city.

Looking therefore to the substance of things, this case can not be brought within the terms of the prohibition unless we are to regard the city itself as being one of the corporations for which money is not to be raised, nor a loan of credit made.

We do not understand counsel as relying upon any other grounds of objection to the validity of this act than those which we have considered, and are of opinion that the judgment of the court below must be affirmed.

 The finest castings of iron and bronze are made by using models of wax. These are imbedded in molds made of fine ground earth, which are then heated red hot. The mold is haked, the wax disappears, and the metal, when poured in, exactly takes its place. The wax model is often made in a gelatine mold, which, being very elastic, will slip off the original object which is to be copied into metal.

—The railroad statistics of Great Britain show that at the close of the past year there were 13,985 miles of railroad open for traffic in the United Kingdom or very nearly one mile of railway to every nine square miles of territory. The cost of these roads was £529,908,673, or \$190,000 a mile. The earnings in 1870 amounted to £45,000,000, or about nine per cent. on their cost.

—Bessemer steel rails are fast taking precedence of all others, and the time is not far distant when iron will not be known as a rail material.

Tunnels.

The Sutro Tunnel.—The report of the Sutro Tunnel Commission has been transmitted to the Senate. The Commission report that the tunnel is entirely feasible, and may be constructed in less than two and a half years, at a cost of about four and a half millions. They believe that the Comstock Lode is a true fissure vein, continuing downwards indefinitely, and express the opinion that, while the tunnel is not a necessity for ventilation or drainage, yet any scheme which promises increased economy in working the mines and rendering valuable the vast amount of now worthless low grade ores in the Comstock Lode becomes of national importance. Whether the Sutro Tunnel project fulfills this condition of economy depends upon the efficacy of the methods now employed in Germany and other countries of Europe for the concentration and profitable working of low grade ores. On this point the Commission has not in this country, by personal investigation, been able to obtain the desired information. The report commends the Sutro Tunnel to favorable consideration as an exploring work for deep mining.

The *Exchange and Review* says: Recent advices from Nevada state that the mining companies working on the Comstock Lode seem to take very little interest in the completion of the Sutro Tunnel. This stupendous work, it will be remembered, is designed to tap the lode at a depth of about 2,000 feet below the outcrop, and is justly believed that it will enable the companies to render their poorer grade of ores available at a moderate expense, to say nothing of the diminished cost of extracting all qualities of ore which are now raised at a great cost from the levels in which they are mined. Moreover, the tunnel, if completed, will drain the mines effectually, and thus greatly lessen, if not altogether obviate, the expense of pumping. The distance the excavation will have to be carried on before striking the lode is estimated to be eight miles, and of this extent but about half a mile has been accomplished. To complete the remainder it is probable that congressional aid will be invoked, and in this event much opposition will be encountered. As it is, mine and mill owners seem to entertain a strong prejudice against the enterprise, notwithstanding the advantages which will accrue from it, and while they admit the fact that its completion will benefit their property, they close their ears to all appeals for aid, and profess an entire indifference to the project.

In the Freiberg silver mining region of Germany two tunnels of extraordinary length have been driven to drain the veins far below the lowest levels. One of these great works, twenty-four miles in length, is driven from the river Elbe, the intention being to cut the veins at an average depth of nearly 2,000 feet. This enterprise was projected more than twenty years ago, and although on account of its magnitude it was much opposed, yet it was vigorously supported by Von Beust and other eminent mining engineers, and received the sanction of the Saxony government. The peculiar characteristics of these veins, which indicate that they fill true fissures, are pointed out as strongly encouraging to the undertaking. Whether it has been completed we are not able to say, but our impression is that it was finished a few years ago. The southern part of the Freiberg district is drained by an adit which is driven from a small stream called the Triebsehe, near the village of Rothschoenberg, and extends over eight miles, or about the projected length of the Sutro Tunnel. At the time this work was begun it was

expected to drain the veins at a depth of 400 feet below the lowest point reached by the system of drainage which was then in use. This adit is more than eight feet wide, nearly ten feet high, and rises in the whole distance nearly thirteen feet.

The Hoosac Tunnel, according to a recent official report, has up to December 31, 1871, required an expenditure of \$6,335,332 exclusive of interest. When the present contractors assumed the management, 9,341 feet had been opened, and in December 1, 1871, the work had been advanced by 7,737 feet, making a total of 17,078 feet and leaving 7,953 feet to be excavated. The central shaft has been finished, and work is now going on at four faces of the rock, much more rapid progress in the future is anticipated. The tunnel, it is hoped, will be finished by March, 1874.

The Nesquehoning Tunnel will soon be completed. The track is already laid half way the distance through the tunnel, and the workmen will put down the balance in a few days. The Lehigh Coal and Navigation Company have stopped their works for a week in order to widen the railroad track in the Panther Creek Valley, preparatory to changing their line for getting coal from their mines to this place. During the time the men are not working the breakers will be overhauled and put in complete order.

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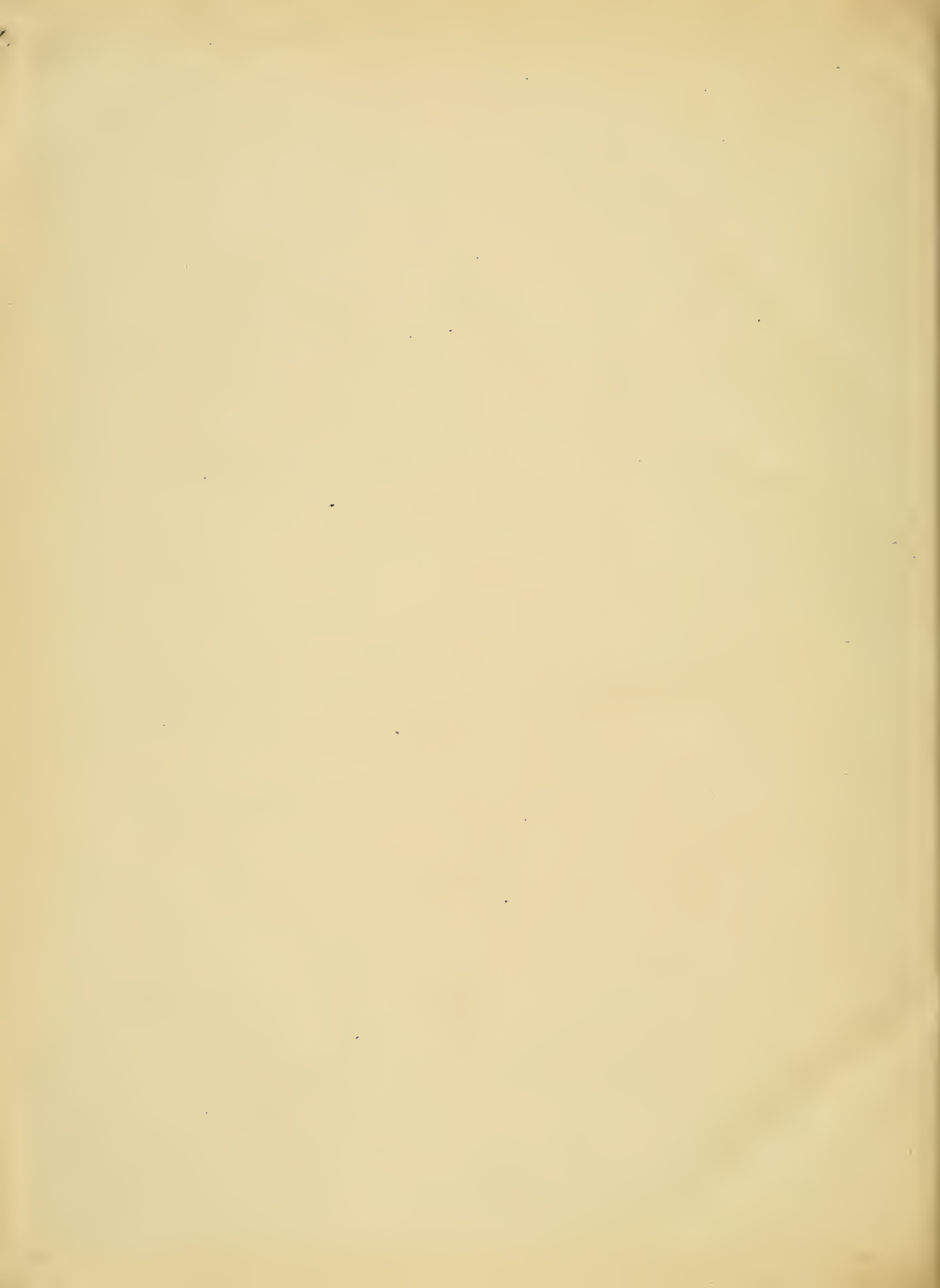
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